



VOL. XXXI.

CLEVELAND, O., APRIL 20, 1905.

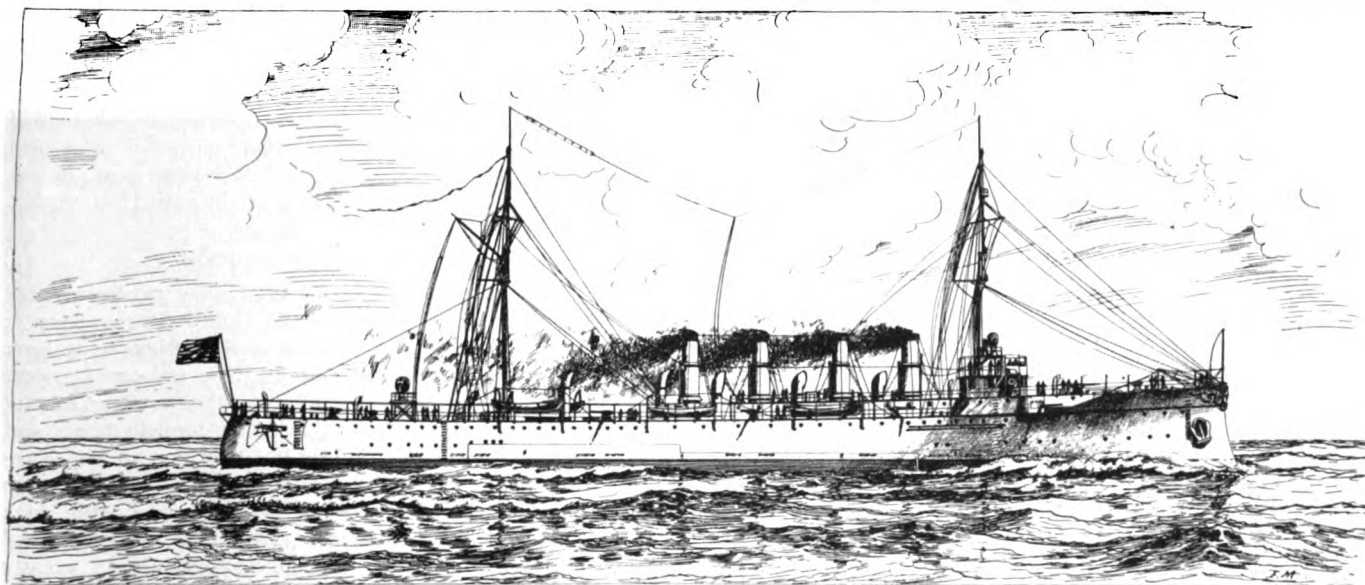
No. 16.

BIDS FOR SCOUT CRUISERS

Bids were opened at the navy department on Saturday last for the construction of the three scout cruisers Chester, Birmingham and Salem, authorized by act of congress of April 17, 1904. Especial interest was felt in these proposals in ship building and material circles not only by reason of the fact that the plans and specifications cover an entirely new type, as far as the United States navy is concerned, but also in view of the uncertainty felt as to what the ship

partment's design, one cruiser to be completed in thirty-two months for the sum of \$1,875,000. Class 2.—Bidder's plans and specifications, one cruiser with turbine engines to be delivered in thirty-six months for the sum of \$1,875,000.

New York Ship Building Co., Camden, N. J. Class 1.—One cruiser to be delivered in thirty-two months for the sum of \$1,824,000. Class 2.—Bidder's plans and specifications, one cruiser with twin-screw turbines to be delivered in thirty-six months for the sum of \$1,830,000. Class 2.—One cruiser



HOW THE SCOUT CRUISERS WILL LOOK WHEN COMPLETED.

builders could do in the matter of delivery and price. Bids for the construction of the vessels in question were invited under two classes, namely:

Class 1.—For the construction of hull and machinery, including engines, boilers and the appurtenances and for equipment complete in all respects in accordance with the plans and specifications provided by the secretary of the navy.

Class 2.—For the construction of the hull and for equipment complete in all respects and for the installation of ordnance and ordnance outfit in general accordance with the plans and specifications provided by the secretary of the navy but on the bidder's own design of machinery, preference being given, other things equal, to a turbine installation.

The bidders and their respective proposals were as follows:

Maryland Steel Co., Sparrow's Point, Md. Class 1.—De-

partment's design, one cruiser to be delivered in thirty-six months for the sum of \$1,866,000. These specifications cover the installation of three turbines of the Westinghouse type.

William Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa. Class 1.—One cruiser on the department's plans to be delivered in thirty-two months for the sum of \$1,793,000 or two cruisers on the department's plans, one to be delivered in thirty-one months and the other to be delivered in thirty-two months, for the sum of \$1,750,000 each. Class 2.—One cruiser fitted with Parsons' steam turbines, either three or four-screw to be delivered in thirty-six months for the sum of \$1,885,000 or two cruisers, with Parsons' turbines same as above, to be delivered one in thirty-five months and the other in thirty-six months for the sum of \$1,825,000 each.

Union Iron Works, San Francisco, Cal. Class 1.—One cruiser on the department's plans to be delivered in thirty-

two months for the sum of \$1,689,000 or two cruisers on the department plans to be delivered both in thirty-two months at \$1,666,000 each.

The Bath Iron Works, Bath, Me. Class 1.—One cruiser on the department plans to be delivered in thirty-two months for the sum of \$1,774,000 or two cruisers as above each to be delivered in thirty-two months for the sum of \$1,729,000 each. Class 1.—One cruiser on the department plans except that the twelve boilers to be as per the firm's Class 2-C bid to be delivered in thirty-two months for the sum of \$1,767,000, or for the sum of \$1,738,000 on condition that the firm is also awarded the contract for one other vessel under their Class 2 bids. Note. It will be understood that this proposal for one vessel stipulates a price of \$1,767,000 in case the company receives the contract for the one vessel alone but makes the lower quotation of \$1,738,000 in case this vessel under department plans is awarded in conjunction with,—or as Mr. Hyde expresses it "coupled up"—with one vessel under the Class 2 proposals.

The Bath Iron Works, Bath, Me. Class 2-C.—One cruiser with Parsons' turbines; guaranteed speed of $24\frac{1}{2}$ knots; twelve Norman boilers; three shaft arrangement; cruising turbines; to be delivered in thirty-six months for the sum of \$1,671,000, or two cruisers under this Class 2-C proposal each to be delivered in thirty-six months for the sum of \$1,623,000 each.

The Bath Iron Works. Class 2-C No. 1.—One cruiser, Parsons' turbines; twelve Norman boilers; three shaft arrangement; no cruising turbines; speed $24\frac{1}{2}$ knots; to be delivered in thirty-six months; for the sum of \$1,639,000, or two cruisers under this Class 2-C No. 1 proposal, each to be delivered in thirty-six months for the sum of \$1,595,000 each.

The Bath Iron Works. Class 2-D.—One cruiser with Parsons' turbines; eight Norman boilers; three shaft arrangement; cruising turbines; to be delivered in thirty-six months for the sum of \$1,654,000, or two cruisers under Class 2-D both to be delivered in thirty-six months for the sum of \$1,606,000 each.

The Bath Iron Works. Class 2-D No. 1.—One cruiser, Parsons' turbines; eight Norman boilers; no cruising turbines; to be delivered in thirty-six months for the sum of \$1,611,000, or two cruisers under this Class 2-D No. 1 each to be delivered in thirty-six months for the sum of \$1,573,000 each.

The Bath Iron Works. Class 2-E.—One cruiser Parsons' turbines; twelve Norman boilers; four shaft arrangement; cruising turbines; speed $24\frac{1}{2}$ knots to be delivered in thirty-six months at \$1,688,000, or two cruisers under these Class 2-E proposals both to be delivered in thirty-six months at \$1,640,000 each.

The Bath Iron Works. Class 2-E No. 1.—One cruiser with Parsons' turbines; twelve Norman boilers; four shaft arrangement; no cruising turbines; speed $24\frac{1}{2}$ knots; to be completed in thirty-six months; for the sum of \$1,658,000 or two cruisers under this Class 2-E No. 1 proposal both to be completed in thirty-six months at \$1,610,000 each.

Bath Iron Works. Class 2-F.—One cruiser Parsons' turbines; eight Norman boilers; four shaft arrangement; cruising turbines; to be completed in thirty-six months for the sum of \$1,671,000 or two cruisers under this Class 2-F proposal each to be completed in thirty-six months for the sum of \$1,622,000 each.

Bath Iron Works. Class 2-F No. 1.—One cruiser Parsons' turbines; eight Norman boilers; no cruising turbines; to be completed in thirty-six months for the sum of \$1,640,000, or two cruisers under this Class 2-F No. 1 proposal both to be completed in thirty-six months for the sum of \$1,592,000 each.

Fore River Ship Building Co., Quincy, Mass. Class 1.—One cruiser on the department's plans to be delivered in thirty months for the sum of \$1,629,000, or two cruisers on the department's plans to be delivered in thirty months and thirty-one months respectively for \$1,557,000 each.

Fore River Ship Building Co. Class 2.—One cruiser, bidder's plans; Curtis marine turbines; Fore River water tube boilers; to be delivered in thirty-four months for the sum of \$1,540,000 or two cruisers under this specification, one to be delivered in thirty-four months and the other to be delivered in thirty-five months for the sum of \$1,468,000 each.

Fore River Ship Building Co. Bid No. 3.—One cruiser on the department plans with reciprocating engines and Fore River water tube boilers to be delivered in thirty months at \$1,598,000 or two cruisers under this specification to be delivered in thirty and thirty-one months respectively, at \$1,524,000 each.

Fore River Ship Building Co. Class 2.—One cruiser with Curtis marine turbine; to be delivered in thirty-four months for the sum of \$1,572,000 or two cruisers of this design to be delivered in thirty-four and thirty-five months respectively at \$1,503,000 each.

Fore River Ship Building Co. Class 2.—Two cruisers, one with Curtis marine turbines and Fore River boilers, the other with reciprocating engines; the first mentioned to be delivered in thirty-four months and the second mentioned to be delivered in thirty months for the sum of \$1,525,000 each.

Fore River Ship Building Co. Class 2.—Two cruisers, one with Curtis marine turbine, and the other with reciprocating engines, to be delivered in thirty-four and thirty months respectively, at \$1,556,000 each.

Note.—In explanation of bids such as the immediate foregoing wherein no point of difference is discernible save in price it may be explained that the divergence is found in the arrangement of boilers. The one class of bids contemplate the arrangement of boilers on the department's plans involving the use of four smokestacks whereas the alternative bids stipulate the arrangement of boilers on the Bowles plan necessitating the use of but three smokestacks and in enabling various economies according to the assertion of Mr. F. T. Bowles of the Fore River company.

DESCRIPTION OF THE CRUISERS.

The plans and specifications for these scout cruisers cover an entirely new type, as far as the United States navy is concerned, and the various features of the design have been given the most careful consideration. The estimated speed, 24 knots, is greater than that of any other cruiser of the navy, and is exceeded only by that of the torpedo boats and destroyers, and while it is slightly less than that of the English scouts now building, the difference in speed is more than compensated for by the ability to maintain the high speed of all conditions of weather, more than twice the coal capacity of the English scouts, and, consequently, a greatly increased radius of action.

The plans as fully developed call for a vessel of the following characteristics: Length between perpendiculars, 420 ft.; length over all, 423 ft. 2 in.; breadth, molded, 46 ft. 8 in.; draught, fully loaded, 19 ft. $1\frac{1}{2}$ in.; depth amidship, molded, 36 ft. 5 $\frac{1}{16}$ in.; displacement, fully loaded, 4,640 tons; displacement on trial, 3,750 tons; draught on trial, 16 ft. $9\frac{1}{2}$ in.; total coal capacity, 1,250 tons; coal on trial, 475 tons; feed water total, 100 tons; feed water on trial, 50 tons; maximum speed, average of 4 hours run, 24 knots; steaming radius at 10 knots per hour, about 6,250 knots; steaming radius at full speed, about 1,875 tons; maximum indicated horse power, main engines, est., 16,000 tons; indicated horse power auxiliaries, 400 tons; time allowed for completion, thirty-two months.

The freeboard of the vessel is greater than that of any

other vessel in the navy, being, at the normal draught, 19-ft. 8½ in. amidships, 34 ft. at the stem, and 21 ft. 6 in. at the stern. The high freeboard insures good seagoing qualities, gives great range of stability and provides a safe and dry vessel under all conditions of weather. On account of the high freeboard it has been possible to provide commodious quarters for the officers and crew, well above the waterline. A forecastle has been provided above the main deck, for about one-quarter of the length, and deck houses have been arranged abaft the forecastle. Ample subdivision has been made to insure the vessel keeping afloat with no resulting serious change of trim or loss of stability if several of the compartments are pierced.

In planning the structural details the greatest care has been exercised to provide a hull which shall combine with lightness the strength and stiffness necessary to successfully withstand the severe shocks which the vessel may be called upon to undergo, and particular attention has been paid to the longitudinal strength of the vessel and to the strength of the watertight bulkheads, that they may be able to withstand the pressure due to the flooding of any compartment and thus avoid endangering the vessel as a whole.

The hull will be built of steel throughout. Two longitudinal bulkheads will be worked continuous throughout the engine and boiler spaces, one on each side, extending from the bottom of the vessel to the main deck, and inclined slightly inboard at the top. In order to avoid any break in the continuity of the strength of the vessel the upper and lower strakes of these bulkheads will extend well beyond the limits of the machinery spaces, forming large brackets gradually tapered off. Between these longitudinal bulkheads, and extending throughout the boiler and engine room, an inner bottom will be worked, so that the vessel will be well protected from injury in case of grounding.

Five decks, designated as forecastle, main, berth, orlop and platform, respectively, will be worked, the main and berth decks being continuous from stem to stern. Nickel steel protection of 80 lb. per sq. ft. will be worked on the shell plating for the length of the machinery space including the dynamo room, extending from about 3-ft. 4-in. below the waterline, to about 9-ft. 6-in. above, abreast the engine and dynamo rooms and 6-ft. 6-in. above, abreast the boiler rooms. At the forward end of the machinery space and the after end of the dynamo room, partial athwartship bulkheads of 40-lb. nickel steel will be fitted, of the same depth as the adjoining side protection. Nickel steel protection will also be fitted in wake of the steering engine.

The battery consists of twelve 3-in. rapid-fire guns and two 21-in. submerged torpedo tubes. The disposition of the battery is as follows: One 3-in. gun on the forecastle deck, and one on the main deck aft, with a large and unobstructed arc of fire in each case; two 3-in. guns, one on each side on the main deck forward, mounted in sponsons and two 3-in. guns, one on each side of berth deck aft, having an arc of fire from dead ahead or astern, respectively, to about 25 degrees forward and abaft of the beam; six 3-in. guns mounted in the waist on the main deck, three on each side.

Two submerged torpedo tubes of the side-loading type with all necessary accessories, including air compressors and accumulators, will be installed in the torpedo room forward, one on each side. Four torpedoes for each tube will be carried. The magazines have been so arranged that about half the total supply of ammunition will be carried at each end of the vessel, and four ammunition hoists driven by constant speed electric motors will deliver ammunition to the guns. Battle order and range indicators will be fitted in accordance with the usual naval practice.

The engines will be of the vertical, twin-screw, four cylinder, triple-expansion type, located in separate compart-

ments, of a combined indicated horse power of 16,000, so arranged for outboard turning propellers when going ahead. The steam pressure in the high pressure receiver will be 250 lb. The stroke of the engine will be 3 ft., and the cylinder diameters will be sufficient to give the required indicated horse power at about 200 revolutions per minute. The necessary auxiliaries and accessories will be provided in accordance with the practice of the bureau of steam engineering.

There will be twelve water tube boilers of the "Express" type, placed in three watertight compartments, with a total grate surface of 693 sq. ft., and a total heating surface of 37,080 sq. ft. The working pressure will be 275 lbs. per sq. in. The steaming capacity will be such that all the steam machinery can be run at full power with an average air pressure in the firerooms of 5 in. of water. Four smoke pipes, each 75 ft. high above the base, will be fitted. An evaporating and distilling plant capable of evaporating and condensing 16,000 gallons of water per day will be installed, and a refrigerating plant of 2 tons capacity will also be fitted. The vessel will be steam heated throughout.

The vessel will be lighted throughout by electricity, about 600 incandescent lamps, twenty-two arc lamps and two 60-in. searchlights being contemplated. To supply the current for these lights and the various electric driven auxiliaries about the ship, deck winches, ammunition hoists, ventilation sets, air compressors, etc., three 32 kilowatt steam-driven generating sets, of 125 volts pressure at the terminals, will be installed in the dynamo room on the platform deck aft.

Two stockless anchors arranged to stow in the hawse pipes, and one navy type anchor stowed on a billboard will be fitted, with complete arrangements for handling and stowing the same.

The windlass will be of the vertical spindle type, with two wildcats and gypsy heads, and will be installed on the main deck forward.

The steam steering gear will be of the usual navy type, with the steering engine located in a separate watertight compartment aft, and with the usual steering stations in the chart house and on the bridge. Two masts will be provided, the foremast being fitted for the installation of wireless telegraph. A room for the wireless telegraph instruments will be located on the main deck amidships. The chart house and emergency cabin in the after end of the forecastle deck will be of bronze. The chart house and the bridge above will be supplied with the usual steering stands, engine telegraphs and indicators.

The arrangement of the quarters provides accommodation for a commanding officer, twelve wardroom officers, five warrant officers, and 340 men. The quarters for the officers are located in the after portion of the vessel with the usual state-rooms, messrooms, etc., as customary in the naval service. The amidship and forward portions of the vessel are given up to the crew, with the usual lavatories, dispensary, sick bay, etc. Quarters for the chief petty officers are provided on the orlop deck forward. The houses on the main deck contain the galleys, bakery, breadroom, blacksmith shop and wireless telegraph room. A large workshop is provided on the berth deck between the engine hatches, and the firemen's wash-rooms are also located on the berth deck, between the up-take enclosures. The following boats will be carried on the vessel and will be handled by davits: one 28-ft. steam cutter, one 33-ft. launch, two 30-ft. cutters, three 28-ft. cutters, one 30-ft. whale boat, one 30-ft. gig, and one 14-ft. dinghy.

Charles Selover, one of the most extensive canal boat builders in the Tonawandas, is now getting his canal boats at the New York end in readiness for operation. A busy season on the canal is expected.

LIVERPOOL SHIPPING LETTER

Liverpool, April 10.—I have received from the Liverpool Underwriters association the list of casualties to vessels of 500 tons gross and upwards which have been entered in the Loss Book during the month of March. They number 475 as against 433 in March last year, 560 in March, 1903, and 413 in the corresponding month of 1902. Of this number 32 of 54,069 tons were totally lost, compared with 18 of 29,433 tons in March last year. These included four British sailers of 7,400 tons and three British steamers of 9,693 tons; also eight foreign sailers of 6,914 tons and 17 foreign steamers of 30,062 tons. The remaining 443 were partial losses made up as follows: 26 British sailers and 224 British steamers, also 26 foreign sailers and 167 foreign steamers. Collisions caused the majority of losses, namely, 130, the other causes being strandings, 126; weather damage, 103; damage to machinery shafts and propellers, 63; missing, 5; foundering and abandonments, 7; fires and explosions, 16; and other casualties, 25. Six of the total losses were vessels seized by the Japanese, their total estimated value including cargoes being \$1,500,000. Their names were Vegga (Swedish registry), Basby Abbey, Venus, Aphrodite, Tacoma, and Harberton, British.

It is just coming to light what a financially disastrous thing the recent North Atlantic rate war has been to the transatlantic lines engaged in it. Both the German lines have declared reduced dividends, and the Cunard company now find themselves unable to declare any return to the ordinary shareholders, although 4 per cent last year was paid. The profit earned during 1904 has fallen from \$1,359,830 to \$401,065, which sum together with \$375,000 taken from the reserve fund is mainly devoted to depreciation purposes. The position of the company's affairs will be better understood if I give the following extracts from the balance sheet, with comparisons with 1903:

	1903.	1904
Brought forward	\$ 24,035	\$ 27,885
Total profits	1,359,830	401,065
Taken from reserve fund	nil	375,000
Depreciation	823,735	609,465
Transferred to insurance account.	151,510	32,115
To credit of profit and loss.....	347,390	37,150
Carried forward	27,885	37,150
Dividend	4 per cent	nil
Working expenses	5,130,925	6,253,285
Repairs and maintenance	603,880	659,595
Total income on revenue account.	7,183,425	7,443,800
Received for interest	54,855	30,035
Income tax	36,685	7,335
Total book value of fleet.....	8,423,385	13,278,230
Bankers acceptances renew ships	nil	3,400,000
Overdrafts from bankers.....	nil	226,500
Investments	1,345,900	1,33,730
Cash in hand and at bankers....	550,500	14,000

It will be seen that the main feature in the report is the enormous increase in the working expenses, while the revenue account shows an increased income of only just over \$200,000. Since the freight and passage money earned show a fair increase on the previous year, it is evident that the effect of the rate war is to be chiefly looked for in these working expenses. However all this information is reserved until next Thursday when Lord Inverclyde will make his annual speech at the annual meeting of shareholders.

The vessels launched in Scotland during the month of March numbered twenty-nine, and measured 45,640 tons, as compared with fifteen, of 47,633 tons in February, and twenty-nine vessels of 45,633 tons in March, 1904. To the total for last month, the Clyde contributed twenty-three vessels of 42,714 tons. Work is being rapidly turned out by the ship building yards at Belfast, and at the present rate, with the orders in hand, a hold bid will be made for the record for 1905. Messrs. Workman, Clark & Co. will contribute largely to whatever total may be reached, as their activity is ab-

normal. Ship building on the Tyne, Wear, Tees and the Hartlepoons is also exceedingly busy, every yard having orders for considerable tonnage. Such conditions, however, cannot last for long, and the same remark applies of course to the Clyde. This statement is made in view of the present and prospective condition of shipping which is anything but bright. When the orders on hand are executed, builders may look for a slow time again quite as bad as was experienced in the immediate past. There is absolutely no brightness in the outlook for freights either in special or general trades, and as building depends upon freights and well supported prospects, there seems no hope for some little time to come.

A Glasgow correspondent says Mr. Robert Dollar of San Francisco has ordered from Messrs. A. Rodger & Co., Port Glasgow, another large steamer for his Pacific trade. Mr. Dollar has only recently taken over from the firm the Hazel Dollar, of 4,300 tons gross, which, it will be remembered, he had to register at Glasgow, because, owing to the peculiarities of the British and United States registration laws, he could not register either at San Francisco or Victoria, B. C., and he is already so satisfied with the vessel that he has ordered a duplicate.

The twin screw passenger steamer Lady Eileen, built by Messrs. Russell & Co., Port Glasgow, for the Canadian passenger service, ran her speed trials on the Clyde on Friday last. The vessel is 168 ft. by 31 ft., by 12.6 ft., and is fitted up as a first rate passenger vessel, with dining and smoking saloons, also sleeping accommodation. She has steam steering gear and is fitted with electric light, also a powerful searchlight; together with a quick freight elevator, electric bells and steam heating. She is owned by the Inter-provincial Navigation Co. of Canada, Ltd., and is for trading between Campbellton and Gaspe in Chaleur bay. The machinery consists of twin triple engines, 12, 20 and 32 in. by 24 in. On her trials the vessel was fully loaded and attained a mean speed of 12½ knots, being half a knot in excess of the guaranteed speed. She left Greenock this week to take up her station. The vessel has been superintended during construction by D. E. North of Hautsport, Canada.

Another development appears to be taking place in Leith shipping trade. A new trade is being started to Pacific ports, and at present three large sailing vessels are berthed at Leith for Puget Sound, Tacoma, and Seattle, and Portland, (Oregon), respectively. The ships are under the line of Balfour Williamson & Co. of Liverpool, San Francisco and Portland.

Very shortly the enormous new dock which has been constructed on the site of the old Manchester race course will be available for shipping, and the canal company's accommodation not only for cotton and general cargoes, but also for timber and other merchandise which is stowed upon open quays will be very greatly increased. Already the dock is full of water, and the principal work remaining to be done is the removal of the old quay wall across the entrance and the erection of cranes for working cargo. The cotton season will be practically over before the dock is opened, but the timber season may be expected to bring it a certain amount of traffic, and possibly the regular lines of large steamers running between Manchester, and American, Canadian, Australian, and Eastern ports may be transferred to it from the neighboring docks. The steamship service between Manchester and London is being increased by an additional steamer weekly.

The second Allan Line turbine steamer Virginian sailed from Liverpool for Canadian ports on Thursday, this being her initial trip. I have to hand some further particulars of the Virginian's speed trials which have been very thorough. Early in the trials a speed of 19 knots was obtained, and after a few runs the rate became 19.8 knots with the engines running at 280 revolutions, and indicating approximately 15-

000 I. H. P. At all speeds the vessel remained totally free from vibration of any kind, and it was noticed that several of the guests, when luncheon was being served, rose and looked out of the sidelights to make sure that she was actually moving. During the trials a large number of leading engineers and ship builders were given special facilities for examining the turbines.

The Fairfield Ship Building & Engineering Co. on Thursday last launched the new turbine steamer *Dieppe*, to the order of the London, Brighton and South Coast Railway Co. for their New Haven and Dieppe service. The *Dieppe* is 274 ft. by 35 ft., by 15 ft. There is sleeping accommodation for 200 second and 36 first-class passengers. Her propelling machinery, consists of three independent Parsons' compound steam turbines and two condensers, and there is a special swift starting, reversing and manoeuvring gear, designed by the builders for the exigencies of the service. By this apparatus the movements of the turbines can be controlled from the starting platform by one engineer. The vessel is expected to develop about 21 knots.

The Liverpool Chamber of Commerce has decided to give a complimentary banquet to the Hon. James Boyle on his retirement from the office of United States consul at Liverpool. The movement has been initiated by Sir Alfred L. Jones, head of the well known shipping firm of Messrs. Elder, Dempster & Co., and is being taken up by nearly all the commercial and shipping firms in Liverpool. Mr. A. P. Moorhouse, manager of the Cunard Steamship Co., has paid Consul Boyle the compliment that the shipping companies had always had the best of advice and assistance from him, and in saying that he was of opinion that he was expressing the views of the other steamship companies in Liverpool. A committee has been appointed to negotiate the arrangements for the proposed banquet and other matters.

BIDS FOR WIRELESS TELEGRAPH OUTFIT

The bureau of equipment of the navy department will on April 25 open bids for wireless telegraphy outfits for delivery and installation at the wireless telegraph stations to be erected by the government as follows: On or near the United States lighthouse reservation at Cape Henlopen, Del.; at or near Beaufort, N. C.; in the navy yard, Charleston, S. C.; on or near the United States lighthouse reservation at St. Augustine, Fla.; on or near the United States lighthouse reservation at Jupiter Inlet, Fla.; and in the naval station at New Orleans, La. All these new stations, which will be of the greatest importance in building up a naval communicative system are to be completed by June 25 of the present year.

The Cape Henlopen station will have two masts each 130 ft. in height and will exchange messages with the government stations at the Highlands of Navesink, N. J., a distance of 123 statute miles; with the navy yard at Washington a distance of 106 miles and with Cape Henry, Va., a distance of 138 miles; each station using power not greater than 3 kilowatts. Messages can be exchanged with ships up to a distance of 200 nautical miles.

The Beaufort, N. C., station will have one mast 180 ft. high and will exchange messages with Capt Henry, Va., a distance of 160 miles; Diamond Shoal lightships, 80 miles; and the navy yard at Charleston, 235 miles. Also with ships up to 250 miles distant. Power not exceeding 5 kilowatts.

The Charleston station will also have one 180 ft. mast and in addition to exchanging messages with Beaufort can communicate (at a power of 5 kilowatts) with the Charleston lightship, 15 miles distant; with St. Augustine, Fla., 215 miles distant and with ships distant not farther than 250 nautical miles. The St. Augustine installation, which will be a virtual duplicate of that at Charleston with which it will com-

municate will also exchange messages with the new station at Jupiter Inlet, Fla., distant 220 statute miles. The Jupiter Inlet station, in turn will communicate with St. Augustine and also with Key West, Fla., distant 195 statute miles. Thus the new stations to be installed this spring will with the station already in existence at Key West form a wireless chain, extending the whole length of the Atlantic coast from Navesink, N. J., to the southernmost outpost of the United States navy in this country.

The new station at New Orleans, the apparatus for which will also be covered by the bids to be opened next week will also have a single mast 180 ft. high but will be capable of using power up to 6 kilowatts. The New Orleans station will exchange messages with the government station at the navy yard at Pensacola, Fla., distant 190 miles and with the station near Galveston, Tex., distant approximately 290 miles, this latter being the longest span contemplated by any of the installations now in prospect.

In the case of each of the new stations the navy department will supply the mast; operating room and table; a power room and a storage battery but aside from these items the contractor must make each installation complete in every detail, the government not being called upon to furnish anything in the way of apparatus or fittings. The apparatus to be installed is to be capable of sending and receiving any wave length between 300 and 1,000 meters. The bureau of equipment has announced that it reserves the right to call upon successful bidders to furnish without charge the services of an expert to instruct the government operators in the use of the apparatus.

The navy department has also let it be known that they will be glad to consider separate proposals for a recording or calling apparatus which can be used in wireless communication at the distances which will constitute the fields of activity of the various new stations. Furthermore the department hopes to receive some proposals from firms or individuals who can supply special apparatus for preventing interference from other sending stations within range or for preventing messages from being read by stations other than that for which they are intended.

BIDS FOR NAVY SUPPLIES

Bids will be opened at the bureau of supplies and accounts at the navy department on April 25 for furnishing various supplies for delivery at the navy yards at Mare Island, California and Puget Sound, Washington. Among the items are 4,000 ft. of enameled iron conduit, 3/4 in. standard pipe size; 8 H. P. power slow speed shunt-wound electric motor; 48 ft. cold rolled turned and polished steel shafting, 2 3/16 in. diameter; 12,000 lbs. railroad spikes; 8,000 lbs. bolts, common, 1/2 in. x 4 1/2 in. with nut and two washers each; one sliding bed gap lathe 18 and 36 in., one No. 0 plain milling machine; 500 pairs standard angle bar joint splices including nuts and bolts; ten complete sets of frogs and switches; 125 gross tons steel tee rails; one ton No. 2 foundry pig iron; 11,646 lbs. of steel sheets; 5,615 lbs. of pipe fittings; 70 dozen files triangular, for the S. A. Woods band saw filing machine; 93,000 lbs. medium steel angles; 15,400 lbs. round bars for davits; 21,100 lbs. of light steel channels; 212,000 lbs. of medium steel plates; 23,000 lbs. of medium steel plates galvanized; 13,000 lbs. of nickel steel for holding down bolts for gun mounts; 20,000 lbs. of steel rivet rod; 24,000 lbs. of square billet steel in lengths of 8 ft. or over.

President Wm. Livingstone, of the Lake Carriers' Association, went to Washington last week to consult Supervising Inspector General Uhler, of the steamboat inspection service, regarding the interpretation to be placed upon some of the new rules governing the inspection of steam vessels.



DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED
OR ASSOCIATED WITH MARINE MATTERS
ON THE FACE OF THE EARTH.

Published every Thursday by

The Penton Publishing Company,
CLEVELAND, OHIO.

CHICAGO: MONADNOCK BUILDING.
PITTSBURG: PARK BUILDING
NEW YORK: 150 NASSAU STREET.

*Correspondence on Marine Engineering, Ship Building and
Shipping Subjects Solicited.*

Subscription, \$3.00 per annum. To Foreign Countries, \$4.50.
Subscribers can have addresses changed at will.

The Cleveland News Co. will supply the trade with the **MARINE REVIEW**
through the regular channels of the American News Co.

Entered at the Post Office at Cleveland, Ohio, as
Second Class Matter.

APRIL 20, 1905.

Two steamers fitted with turbine engines have now crossed the Atlantic ocean and the turbine mode of marine propulsion may now fairly be said to be given its first commercial trial. Data is not at present available as to the economy of the turbine in such large installations, but from the standpoint of comfort the passengers are a unit in declaring the turbine-driven steamer to be far superior to the reciprocating-engine driven steamer. In naval vessels, however, much valuable data is consequently accumulating. The turbine cruiser *Amethyst* of the British navy recently underwent her commission and the steam trial with most satisfactory results. She is the first cruiser to be fitted with a Parsons Steam turbine. Three sister vessels—the *Topaze*, *Sapphire*, and *Diamond*—have been built, of the same dimensions with boilers of equal power, but with reciprocating engines applied to twin screws; whereas the *Amethyst* has three screws driven by steam turbines, the two outer shafts also carrying separate reversing turbines, so that the *Amethyst* can be maneuvered like a twin-screw vessel. The design for all these third-class cruisers was prepared in 1901 by Sir William White and was one of the last for which he was responsible before his resignation. For the three twin-screw ships it was estimated that a maximum speed of $21\frac{3}{4}$ knots would be obtained at the full-power trial, the engines developing about 9,800 H. P.

In the *Amethyst*, while the boilers have a heating surface equal to that of the other ships, it was decided to utilize the same weight for turbines, shafting, and propellers as was required for reciprocating engines, shafting, and propellers in the other ships. A direct and effective comparison was thus made possible between the old and new types of propelling machinery. In the *Viper* torpedo-boat destroyer a similar comparison has been made with ordinary destroyers of identical dimensions having the same total weight assigned to machinery and boilers, but not identical boiler-power.

In that case, while there was a great gain in maximum speed in the *Viper* the turbines proved much inferior to reciprocating engines in the economical use of steam at cruising speeds where low powers sufficed, and the coal endurance at cruising speeds was much less than with ordinary engines. This is a serious matter in warships, which ordinarily cruise at low speeds. In the *Amethyst* Mr. Parsons aimed at economy in cruising speeds as well as at full-power; for this purpose separate small turbines have been fitted and are used when cruising. On the port shaft, at its forward end, there is a high-pressure cruising turbine, and in a similar position on the starboard shaft an intermediate pressure cruising turbine. At low speeds the steam enters the former turbine, then passes to the intermediate cruising turbine, thence to the main high-pressure turbine used for maximum power, and, finally, through the main low-pressure turbines to the condensers. At full-speed both cruising turbines are cut out, and the ship is driven by the three main turbines. A high rate of expansion is thus obtained at all speeds, and the results of trials have proved that the arrangements have secured the desired economy at cruising speeds while adding considerably to the maximum speed.

The reciprocating-engined ships have exceeded the speed promised by the designer, reaching 22 to 22 1-3 knots; but the *Amethyst* has attained 23.6 knots, that is to say, she is faster by about 1.3 knots. Up to the speed of 14 knots the reciprocating engine shows a superiority in economy of steam and coal consumption. At 10 knots only about 900 H. P. has to be developed out of 10,000 H. P. available; and the *Amethyst* required about 2,900 lbs. of coal per hour as against 2,300 lbs. in the *Topaze*. At 14 knots the two ships require about the same amount of coal, 3,600 to 4,700 lbs. per hour; at 18 knots the *Amethyst* had a considerable superiority in performance, burning only 8,400 lbs. per hour, while the *Topaze* burnt 10,900 lbs. At 20 knots the *Amethyst* burnt 10,900 lbs., and the *Topaze* about 15,400 lbs. At full-power the *Topaze* steamed 22.1 knots per hour, and burnt 26,100 lbs. of coal; whereas the *Amethyst* steamed 23.6 knots, and burnt only 24,400 lbs. of coal. It is estimated that to drive the *Topaze* at equal speed 14,000 H. P. would be required, and the maximum development possible in that vessel is about 9,900 H. P. These figures show that from 14 knots up-

wards turbines arranged as in the Amethyst gain rapidly in economy in the use of steam; and so, with boilers of a given capacity, can develop much greater power and drive a ship considerably faster than reciprocating engines can drive her. Mr. Parsons is to be congratulated on having thus overcome to a very great extent the disadvantage at which the turbine was previously placed in warships when cruising. In merchant ships, designed to work constantly at or near maximum power, no corresponding difficulty occurs, and within the range of power occurring in practice greater economy of coal and steam is possible with steam turbines than with reciprocating engines, when both types are worked under the best conditions. These cruiser trials furnished data of the highest value to the designer of future swift ships for the mercantile marine as well as for war fleets.

LAKE NAVIGATION TEMPORARILY SUSPENDED

Navigation on the great lakes is practically suspended. Mr. Harry Coulby, president and general manager of the Pittsburg Steamship Co., telegraphed orders from Sault Ste. Marie to his company not to send another vessel out until weather conditions are changed. He reports that the ice extends in a solid field eighteen miles beyond Whitefish Point with 100 vessels in it and that the field practically extends in the same direction south of the canal. The ice crusher Algomah, which was sent from St. Ignace on Monday, has been making very slow progress and many of the freighters which have been bucking the ice for days have injured themselves more or less. It is a foregone conclusion that the boats which left port a week or more ago will lose heavily on trip and cautious owners will send no more out until the weather is moderated and the wind shifted.

Shippers who were depending upon a heavy movement in April are disappointed. It is not expected that any material headway will be made for a week yet, by which time April will be well spent and an inconsiderable quantity of ore will consequently be moved this month. Ore is moving very freely from the docks to the furnaces and the docks will therefore be in very good shape by May 1. It is calculated that with the April movement added about 2,500,000 tons of ore will be on dock on May 1.

The same conditions that obtain at the head of the lakes obtain also at the foot of them. The west winds have piled the ice for miles around Buffalo and a number of freighters loaded with coal became lodged in it. Chartering in coal and ore, of course, has been extremely light under such conditions and owing to the condition of ice in the Straits of Mackinaw, grain chartering out of Chicago is absolutely nil.

AT THE HEAD OF THE LAKES

Duluth, April 18.—The Provident ship J. H. Reed took on the largest cargo of oats ever loaded at this port and is on her way east. The load consisted of 446,000 bu. and was taken at the Itasca and Consolidated elevators. The Mutual liner Northern Wave collided with the drawbridge at Houghton on Friday and wrecked it. The draw span now lies on its side directly across the channel with both ends in the water, a complete wreck. The machinery for operating the draw refused to work and the stem hit it at fair speed. The Wave was not much injured.

The steamer Victory, of Pickands, Mather & Co., which has been lengthened 72 ft. at the Superior Ship Building Co.'s yard is to be floated at once and will proceed to Two Harbors

for a load of ore. The consort Constitution will not be ready for sea for a week or two.

A lot of Duluth wheat has been sold to go to Minneapolis for the filling of short sales there. The amount has been put at 500,000 bu. and of course will take just as much from the eastern trade. But there is some riot over grades and it is possible that not all the amount sold will be shipped there. Several cargoes of wheat for the east will be loaded this week, and sailings will be made as soon as the way is clear. But there is no change in freight rates.

Last week was the first for five years in which Duluth-Superior mills have made no output; this is especially notable from the fact that navigation is open and that the mills should be doing business if ever in the year. Some flour is coming to the two cities from Minneapolis, but the amount is not so large as usual, and the flour trade seems particularly dull.

LAKE SUPERIOR CONSOLIDATED AFFAIRS

Sault Ste. Marie, April 18.—The barge Agawa of the Lake Superior Power Co. is loading 6,000 tons of steel rails at the Sault for delivery to the Canadian Pacific road at Fort William, for the far west. Other large shipments will be made at once, both east and westward. The rail mill of the Lake Superior company is busy and turning out about 500 tons a day, and the company has sold its product up to next January. The charcoal blast furnace was blown in two or three weeks ago and is running steadily and satisfactorily, making about 130 tons a day of charcoal pig from imported ores. There is not the bustle and rush that was noticeable about the Canadian Sault in the days of the F. H. Clergue regime, but confidence is rapidly being restored, and most of the works that he planned and carried nearly to a completion are believed to be making good money. The management is careful and conservative, and is spending as little money in new departures as possible, is trying to build up its working capital and to establish itself strongly in view of possible strenuous competition, which seems to be coming. At this time in addition to the iron and steel ends of the combination, the large ground wood pulp mill is in operation and the sawmill is to be started very soon. A large force of men is in the woods cutting pine and pulp timber, and the Algoma Central road is doing a profitable business. Ore shipments from the Helen mine have not commenced for the season, but will be under way as soon as the ice conditions at Michipicoten and elsewhere permit. The mine has continued to improve with further development, and shows more tonnage in sight than at any time in the past, not approximating, of course, the tremendous estimate made for Mr. Clergue by Dominion officials in former days, but quite a property, nevertheless, and well worth the expense that it has caused and the road that has been built to it.

NEW STEAMER FOR WILSON TRANSIT CO

The Wilson Transit Co. closed a contract last week with the American Ship Building Co. for the construction of a new steamer for 1906 delivery. The new vessel will be a duplicate of the L. C. Hanna, recently launched at the yard of the American Ship Building Co., and will, therefore, be 524 ft. over all, 504 ft. keel, 54 ft. beam and 31 ft. deep. She will have triple-expansion engines with cylinders 23½, 38 and 63 in. diameters by 42 in. stroke, supplied with steam from two Scotch boilers, fitted with Ellis & Eaves draft. This makes seven boats that the American Ship Building Co. has now under order for next year's delivery.

Bert Mayo has been appointed local manager for Tona-wanda of the Great Lakes Towing Co. to succeed Frank Bel-finger, who recently resigned.

EMANCIPATION OF OUR WATERWAYS

At the meeting of the American Philosophical Society, held at Philadelphia last week, Prof. Lewis M. Haupt, an engineer who has made exhaustive studies of waterways, read a paper upon the subject "The Emancipation of the Waterways." Prof. Haupt, who was listened to with close attention, said:

"Probably no expenditure made by the government produces a larger return than that for the development of our waterways. They are the lines of least resistance, but in a state of nature they are not always available. Their economic possibilities are inestimable, when not obstructed by bars or tolls. By the improvement of the channels connecting the great lakes to a depth of 20 ft., not only has the cost of the transportation been greatly reduced, but the enormous stimulus given to manufacture has added largely to the population and wealth of the cities encircling these waters. Thus the rate on a bushel of wheat from Chicago to New York by the lakes and Erie canal in 1866, when the Sault canal draught was limited to 12 ft., was 29.62 cents, whereas the rate on a 20-foot draught, in 1904, was only 4.71 cents, or only about one-sixth, thus effecting a saving of 84 per cent. The rail charges between the same terminals were for the year 1866 32.79 cents, and in 1904 11.11 cents, showing a reduction of about two-thirds in the charges by rail. From these significant figures it appears that while the charges by rail and water had both been greatly reduced, in 1866 the water charge was 90 per cent. of that by rail, while in 1904 it was only 42 per cent.

"But a still more impressive illustration as to the beneficial effects of this improvement is set forth by the statement made in 1892 by Senator William P. Frye, in presenting his committee report, wherein he said that for the year 1890 'the total expenditure for water improvements of the lakes has amounted to about \$30,000,000, or approximately one-fifth of the annual saving effected in transportation. * * * Our waterways have acted as the most powerful regulators of rates. * * * When it is considered that a diminution of one mill per ton on the railroads of the country effects a saving of nearly \$100,000,000 to the shippers in transportation, the value of this restrictive power cannot be overestimated.'

"Had the distinguished senator added as a recognized fact that such regulation by water does not reduce, but greatly increases the revenues of the railroads, he would but have emphasized the commercial paradox, which comparatively few persons appear to recognize.

"It is not surprising that the economists of the French Republic, which has expended over \$700,000,000 on her internal waterways, which are free of tolls, believe this policy to be fully justified by the indirect returns and the thrift and prosperity of the people incidental thereto. So, too, the Dominion of Canada has not hesitated to provide the munificent sum of \$95,316,910.07 for her system of internal waterways, which have returned only about one-eighth of this sum, yet the government recognizes that waterways and roadways are essential to the commercial life of the country.

"Great Britain has learned from a sad experience that the purchase of 1,138 miles out of a total of 3,906 by the railroads up to 1883 has so retarded her trade that she is no longer able to compete successfully with her foreign rivals, and Parliament has prohibited the further control of the waterways by hostile interests, and is returning to the policy of rehabilitating them under corporate management.

"Belgium, but little larger than Vermont, has 1,300 miles of waterways, of which the center is Antwerp. Notwithstanding the fact that the state owns most of the railways, it has encouraged the construction of the canals so as to render the transportation 'as cheap as possible, that by this means the Belgian manufacturer may be enabled to compete on most advantageous terms with his foreign rivals.'

"Germany is building an extensive system of canals to

connect the Rhine with the Vistula, passing through her national capital. Russia is urging a thousand-mile canal to unite the Baltic and Black Seas. France is proposing further extensions to her ample facilities, and intends making a seaport of Paris. Austria and Italy are also expending large sums for the benefit of their trade with foreign countries, and yet the astute American, who is on the alert for the best and most economic administration, apparently fails to appreciate the great utilities and possibilities lying almost in a state of nature at his very doors.

GREATER RELATIVE PROFIT.

"What indifference to the earning capacity of canals means in the cost of wear and tear, for maintenance may be well exemplified by a comparison of the reports of the United Railroads of New Jersey for the best year of the canal traffic, before it was leased by the railroad, and when its traffic reached nearly to 4,000,000 tons per annum. In the reports of the company for the year 1866 it is stated:

Cost of Amboy Railroad and equipment.....	\$10,059,000
Cost of canal and appurtenances.....	4,381,251
Cost of operating railroad for the year....	3,801,732
Cost of operating canal same period.....	360,513
Net revenues from railroad.....	511,162
Net revenues from canal.....	933,642

"The largest manufacturing district in the world, that at Pittsburg, has been praying congress for a charter to construct a ship canal to connect the Ohio River at Beaver with Lake Erie at Ashtabula, so that the congestion of the trade in coal, iron and steel may be raised and the price of these commodities be reduced, but in vain. In this district the annual tonnage now exceeds 86,000,000, which is greater than that of any port in the world, and the great rivers leading to the sea are not yet navigable for boats of even 6 ft. draught. They must wait for floods to float them to the markets. What this means may be best shown by the experience of the season of 1895, when the coal, which had been accumulating from April 18 until Nov. 28—seven months—and which amounted to 1,200,000 tons, was providentially released by a flood only in time to prevent it being frozen in and a large part of it lost. As it was, the cost of keeping the barges afloat amounted to \$2,000 a day. The value of the plant thus tied up was estimated at \$6,500,000.

"For more than twenty years urgent demands have been made for the creation of harbors of refuge along the New Jersey coast, which is recognized as one of the most dangerous on the great bay between Cape Cod and Cape Hatteras; but, while several estimates have been submitted for projects costing from three to four millions cash, they have been rejected as unworthy of improvement, because of the absence of sufficient local commerce, caused by the existing bars which it is desired to remove. Interior coastwise canals have been recommended for about a century, but as yet only a few links have been built, and those mainly by private and state aid.

"If the government desires to adhere to the policy of expending 75 per cent of its revenues for the war, navy and pensions establishments, it would seem to be wise to surrender its jurisdiction over the rivers and harbors to local or state authorities, that there may be opportunities afforded for the creation of channels of ample capacity, not only for commerce, but also for the use of the military and naval arms of the service, in case of necessity. Thus may the waterways of the country be emancipated from the shackles which have seriously retarded their development."

Congress at its last session passed a bill to maintain a system of opening submarine signals along the Atlantic coast from Delaware breakwater to Portland. The purpose of the bill is to make practical application of the system of submarine telephoning designed by the late Prof. Elisha Gray at the suggestion of Mr. Arthur J. Mundy, of Boston.

SUMMARY OF NAVAL CONSTRUCTION

The summary of naval construction, prepared by the bureau of construction and repair shows the customary rate of progress on naval vessels. The Connecticut is, however, gaining on the Louisiana and has reduced the latter's lead to less than 2 per cent. Following is the summary:

BATTLESHIPS.		1905.	
Name of Vessel.	Building at.	% of completion.	
		Mar 1	Apr. 1.
Virginia	Newport News S. B. & D. D. Co.....	80.82	83.74
Nebraska	Moran Bros. Co.....	67.59	69.31
Georgia	Bath Iron Works.....	75.09	76.44
New Jersey.....	Fore River Shipbuilding Co.	77.9	79.4
Rhode Island	Fore River Shipbuilding Co.	82.5	84.
Connecticut	Navy Yard, New York.	67.17	70.24
Louisiana	Newport News S. B. & D. D. Co.....	69.54	71.90
Vermont	Fore River Shipbuilding Co.	38.8	43.4
Kansas	New York Shipbuilding Co.	43.5	48.1
Minnesota	Newport News S. B. & D. D. Co.....	58.69	61.76
Mississippi	Wm. Cramp & Sons....	22.55	24.39
Idaho	Wm. Cramp & Sons....	19.98	22.27
New Hampshire	New York Shipbuilding Co.	0.00	1.5
ARMORED CRUISERS.			
Pennsylvania	Wm. Cramp & Sons....	100.	
West Virginia	Newport News S. B. & D. D. Co.....	99.75	99.95
California	Union Iron Works.....	72.2	73.5
Maryland	Newport News S. B. & D. D. Co.....	97.50	99.
South Dakota.....	Union Iron Works.....	69.5	71.3
Tennessee	Wm. Cramp & Sons....	65.14	69.45
Washington.....	New York Shipbuilding Co.	66.4	70.2
North Carolina	Newport News S. B. & D. D. Co.	53	2.15
Montana.....	Newport News S. B. & D. D. Co.....	55	2.01
PROTECTED CRUISERS.			
Chattanooga	Lewis Nixon	99.13	100.00
Galveston	Wm. R. Trigg Co.....	98.	100.
St. Louis	Neafie & Levy S. & E. B. Co.....	58.8	60.6
Milwaukee	Union Iron Works.....	68.0	69.8
Charleston	Newport News S. B. & D. D. Co.....	92.02	92.56
GUNBOATS.			
Dubuque	Gas Engine & Power Co.	88.2	90.9
Paducah	Gas Engine & Power Co.	78.6	82.8
TRAINING SHIPS.			
Cumberland	Navy Yard, Boston....	94.	95.
Intrepid	Navy Yard, Mare Island	86.	95.
TRAINING BRIG.			
Boxer	Navy Yard, Portsmouth	98.00	99.5
TORPEDO BOATS.			
Stringham	Harlan & Hollingsworth Co.....	99.	99.
Goldsbrough	Wolff & Zwicker.....	99.	99.
Nicholson	Lewis Nixon.....	99.	100.
O'Brien	Lewis Nixon.....	99.	99.
COLLIERS.			
Eric	Navy Yard, New York..	0.	0.

The Kelly-Spear Co., Bath, Me., has received an order to build a four-masted auxiliary schooner of 700 tons and work will be begun upon it at once. The stock in this company, owned by the estate of the late Capt. John R. Kelly, has been sold to D. Howard Spear and Elijah F. Sawyer, who had been members of the old firm. The name of the old company will be retained.

DIVERSION OF INTERNATIONAL RIVERS.

President Roosevelt has appointed a special commission to deal with three important questions which have arisen relative to diversion of and interference with the course of international rivers. This commission consists of Judge Penfield, solicitor for the state department; Special Assistant Attorney General M. C. Burch and Prof. F. H. Newell, of the geological survey, and has just held its first meeting.

The questions before the commission have formed the subject of extensive correspondence between the state department and Mexico, on the south, and the Dominion of Canada, as represented by Great Britain, on the north. On the south there is the long standing controversy growing out of the damming of the Rio Grande and the use of the waters of the upper river for irrigating purposes in American territory, to the injury of the Mexican farmers on the right bank of the river. The Mexicans hold that the Rio Grande is a navigable river and that consequently this diversion of the water is a violation of international law. To the westward the commission is to deal with the Colorado river, where the upper waters in American territory are about to be diverted, to the loss of the Mexican ranches in Lower California.

On the north the Milk river projects in Montana have alarmed the Canadians. Rising in the United States, this river flows into Canada and back into Montana. The Canadians have been making large use of the waters on their side, and this has led to a project by the people of Montana to cut out the entire bend in the river on the Canadian side by a canal, the effect of which would be to deprive the Canadians of the waters.

As a result of a conference with Secretary Taft, it was decided that as projects such as the international dam across the Rio Grande river and the reclamation dam in the Colorado river had been authorized by congress there was nothing to do but proceed with the work, leaving the broader question of international riparian rights to be treated diplomatically.

TO BUILD SUBMARINES UNDER COVER

Washington, April 15.—When in the city today Mr. F. T. Bowles, formerly chief constructor of the United States navy but now president of the Fore River Ship Building Co., announced that his company would immediately begin the erection at its plant at Quincy, Mass., of a building for use in the construction of submarine torpedo boats under cover and designed primarily to enable the maintenance of greater secrecy regarding the size, design and progress of construction of the under water craft. The new building which will be of frame construction will be 230 ft. in length; 60 ft. in width and 23 ft. in height under the trusses. The water frontage is 60 ft. and the building will be so erected that it can be lengthened if desired at a minimum expense and without interference with the work in hand. As originally constructed the building will have building berths for the simultaneous construction of four submarine boats each of a length of 80 to 100 ft. It is expected that the structure will be completed early in June.

In conversation with the Review correspondent Mr. Bowles made the formal announcement that the technical offices and shops of the Holland Submarine Torpedo Boat Co. will be moved to Quincy and incorporated as a part of the plant of the Fore River company. This is a move which has been rumored for some time past but Mr. Bowles' present statement is the first definite announcement on the subject. He stated that the executive offices of the submarine boat company will remain at 11 Pine street New York but the entire technical department will be removed to Quincy where an office building and other structures will be erected for their accommodation. The plant and testing ground heretofore maintained by the Holland company at Suffolk, L. I., will be discontinued.

Progress of the Merchant Marine

The Merchant Marine League of the United States which was organized in Cleveland in November last by the merchants and manufacturers of the middle west has already attained a considerable standing throughout the country and now has enrolled in its membership over 300 persons. Eighteen states are represented so far, but vice presidents have been appointed for only five of them. The purpose is to appoint a vice president in each state as soon as the membership in the state justifies it. The vice presidents so far are: Massachusetts—Hon. Samuel L. Powers, Powers & Hall, Boston; Michigan—George H. Barbour, vice president and general manager Michigan Stove Co., Detroit; New York—O. P. Letchworth, president Pratt & Letchworth Co., Buffalo; Ohio—D. B. Meacham, Rogers, Brown & Co., Cincinnati; Pennsylvania—George E. Bartel, president The Bourse, Philadelphia. Every mail brings scores of letters of commendation regarding the object of the league, but of course it is impossible for the Review to find space for more than a few of them. Mr. Cameron Currie of Cameron Currie & Co. bankers of Detroit, wrote as follows during the present week:

"In response to your letter of the 10th inst. I enclose application and cheque for ten dollars. I hope you will be able to accomplish results—it will have to be a campaign of education, and the first lessons should be given to the newspaper fraternity—they will have to do the moulding of public opinion, and at the same time eradicate the antagonistic feeling towards proper subsidy aid that they have created. In this age of "tainted money" and other cranky isms, it is too easy to condemn even as worthy an object as protection to our merchant marine. There is no more vital question, in my judgment, before the country and none so misunderstood—our own shipping with its consequent results would in short order repay anything expended to obtain it many times over and in due time would make us the banking center of the world."

Mr. Fred Muller, secretary of the New Orleans Board of Trade, wrote as follows:

"The question of rehabilitation of the American Merchant Marine is a subject in which our city is vitally interested. The matter has time and again been before our board of directors, and we have also expressed our opinion before the Merchant Marine Commission while in session in the board of directors' rooms of our exchange several months ago. Your efforts to stimulate the ultimate success of the movement are bound to have the desired result. We also realize

that under the stipulations of the new bill the Gulf ports, and particularly New Orleans, will be greatly benefited and our exchange has taken steps in this connection to put forth its claims when the bill comes up for passage. Realizing, as you state, that united efforts are essential to attain desired ends, I take pleasure in mailing you, under separate cover, a copy of our 1903 membership roster, in the absence of the latest revised copy, which is not at hand. I have no doubt that among the members you will find quite a number who, it is likely, would be willing to join your association."

Mr. Eugene Tyler Chamberlain, commissioner of navigation, endorsed the objects of the league highly in a brief interview at Washington last week. Mr. Chamberlain is probably the most accurate authority on the subject of the merchant marine in the United States as he has given the better part of his life to a study of it. He commended the league highly for endeavoring to keep alive interest in the subject of shipping during the long wait that must ensue before congress meets again. This the league purposes doing by issuing continually throughout the summer statements concerning the merchant marine. There is an enormous mass of data available that needs only to be generally circulated to convince the country that assistance to the merchant marine in the foreign trade is necessary. This data the Merchant Marine League proposes to put in convenient form for general reading. In point of fact one of the most salient effects of the tour of the merchant marine commission last summer was the interest which was aroused in the question of shipping and the fact that it set thousands of persons thinking who probably hitherto had not given the subject much thought. It is a common error to think that only the ship owner and ship builder are interested in shipping. The merchant, manufacturer, banker and farmer have an interest quite as intimate.

It is understood that the shipping bill which was framed by the merchant marine commission and introduced at the last session of congress will be presented at the opening session next December with practically no amendment. It is a very reasonable and sensible bill, the revenues for which are principally derived from tonnage dues. It takes no money from the public treasury and therefore is calculated to quiet those who feared that money would be taken directly from the treasury to aid a single industry. American shipping on the high seas would very speedily come to its own aid if given, during its present struggling period, a fighting chance.

REPAIRS ON FOREIGN VESSELS NOT CUMULATIVE

Washington, April 18.—Two legal decisions of vital importance to American shipping and ship building interests have just been rendered by Attorney General Moody at the request of the department of commerce and labor. The case at issue is a unique one being that of the British steamship Daventry which was wrecked in the United States, sold to an American and twice repaired in the United States at an expense of more than three-quarters her cost, and the decision of the Attorney General of the United States denying her American registry establishes an important precedent. The case has attracted much attention among American ship owners and especial interest was felt in the bearing on the case of the circumstances of heavy cumulative expenditure in the United States.

The decisions of the attorney general follow:

April 10, 1905.

The Honorable The Secretary of Commerce and Labor, Sir:

I have the honor to respond to your letter of March 13, 1905,

in which you state that application has been made to the commissioner of navigation for the issue of a register to the foreign-built S.S. Daventry, she having been wrecked in the United States and repaired by her foreign owners, and subsequently sold to a citizen of the United States who has applied for a register. You ask for an expression of my opinion on the following proposition:

Do the words "shall be purchased and repaired by a citizen of the United States" in Section 4136 R. S., contemplate that the purchasing must be by an American citizen who must make the repairs after his purchase?

This department is aware that your department has already rendered an opinion on this question (20 Op. A. G. 253) and that that opinion hitherto has been followed by the commissioner of navigation.

The opinion referred to, rendered in 1891, nearly fourteen years ago, contains a very thorough review of the question submitted by you, and the conclusion was reached that if the repairs made upon the vessel after the wreck were equal

to three-fourths of the cost of the vessel when so repaired, she was entitled to American registry, whether such repairs were made by her foreign owners or by the American applicant after his purchase of the vessel. This conclusion was based upon the theory that while such a case was not within the strict letter of the law, it was within the spirit and general intent thereof. As stated in your letter the construction thus placed upon the law was adopted by the administrative officers and has been followed to the present time. Congress also may be said to have acquiesced in such construction by ignoring all attempts to change the law. I therefore see no reason for questioning the interpretation heretofore given this statute, especially as it has been so long administered in accordance with such interpretation."

THE SECOND OPINION.

The second opinion rendered by the attorney general bearing upon the same case and as will be noted supplementing the above expression, is as follows:

• April 11, 1905.

The Honorable The Secretary of Commerce and Labor. Sir:

I have the honor to respond to your letter of March 14, 1905, in which you state that—

Application has been made by a citizen of the United States to the commissioner of navigation for the issue of a register to the foreign-built S.S. Daventry, as provided for by Section 4136 R. S. as amended by Section 2 of the Act of July 5, 1884, on a showing of facts as follows:

On or about Jan. 20, 1903, the Daventry grounded on Frying Pan shoal, off Cape Fear, and in a leaking condition was stranded on a safe bottom near Southport. She was repaired at Newport News at a cost of approximately \$42,000. On or about Dec. 16, 1904, the same vessel grounded off Hunting Island Lighthouse and was again repaired at Newport News at a cost of approximately \$14,000. On Jan. 5, 1905, the British owners of the Daventry sold her to a citizen of the United States and their receipt of \$71,000 dated Jan. 25, 1905, in full payment for sixty-four sixty-fourths shares of the vessel has been submitted.

1. In ascertaining, as of January, 1905, whether the "repairs put upon such vessel are equal to three-fourths of the cost of the vessel when so repaired" can the repairs made after January 20, 1903, and December 16, 1904, be aggregated at their original amounts?

Section 4136 R. S. reads as follows:

The secretary of the treasury may issue a register or enrollment for any vessel built in a foreign country, whenever such vessel shall be wrecked in the United States, and shall be purchased and repaired by a citizen of the United States, if it shall be proved to the satisfaction of the secretary that the repairs put upon such vessel are equal to three-fourths of the cost of the vessel when so repaired.

This section has been the subject of several opinions by my predecessors.

On Dec. 5, 1877, Attorney General Devens in an opinion to the secretary of the treasury (15 Op. A. G., 402) said:

This section reproduces the provisions of the act of Dec. 23, 1852, Chap. 3, in force at the time of the adoption of the Revised Statutes. Before the passage of that act, applications had frequently been made to congress for special legislation authorizing registers to be granted for foreign-built vessels, in cases where such vessels had become damaged, disabled and unseaworthy, and, having been purchased while in that state by American citizens, were repaired by the latter at ports or places within the United States. The practice of that body had been to allow these applications upon conditions similar to the one contained in the act of 1852 and now found in said Section 4136, namely, that it should be proved to the satisfaction of the secretary of the treasury that the cost of the

repairs "exceeds three-fourths of the original cost of building a vessel of the same tonnage," or is "equal to three-fourths of the original cost of building a vessel of the same tonnage" or "exceeds three-fourths of her value after having been so repaired" or "is equal to three-fourths of the value of said vessel at the time of said repairs," etc. Instances of special legislation authorizing registers to be granted in cases of that sort may be seen in 6 Stat., pp. 313, 371, 458, 753, 831, 914; 9 Stat., pp. 686, 695, 709, 710, 713, 714, 719, 732, 757, 796, 798; 10 Stat., pp. 725, 726, 728, 731, 741, 753, 767, 785, 835, 844.

The object of the act of 1852 was to do away with the necessity for special legislation in such cases by conferring upon the secretary of the treasury a general authority to issue registers or enrollments in like cases upon the like condition. The purpose of congress in enacting this legislation was to encourage the practical rebuilding in the United States of foreign vessels wrecked here. If the repairs occasioned by two disasters may be aggregated, it follows that the repairs occasioned by ten different wrecks may be aggregated. The same part of the vessel may have been injured on each occasion so that when the repairs occasioned by the last wreck have been completed, nine-tenths of the vessel may even then be foreign-built, instead of only one-fourth which the statute contemplates. It may be urged that the aggregate of the various sums expended by her owners upon her repairs equals three-fourths of her value, but the answer to this argument is found in the analysis of the statute which conclusively shows that the inducement of American registry was offered for the practical rebuilding of the vessel in the United States. Slight repairs would probably be made upon her here in any event.

In 20 Op. A. G., 253-254, it was said:

* * * The plain intention of section 4136 was to give to wrecked vessels, which were practically rebuilt in the United States, the same privilege that vessels would have if wholly built within the United States. Its ultimate purpose was to aid American ship building, and it was evidently considered by congress that the rebuilding of three-fourths of a vessel was to be encouraged as well as the building of a vessel entire.

Again in 21 Op. A. G., 143-144, Attorney General Olney said:

Answering your further question, I am clearly of the opinion that the word "cost" in said section is to be construed literally. If the actual cost of the repairs is three times the actual purchase price of the wreck, then in my opinion it is entitled to registry.

The statute does not empower the commissioner of navigation to issue a register or enrollment in the event the aggregate cost of repairs of different wrecks equals three-fourths of the cost of the vessel; but on the contrary the language of the statute precludes such a construction, for it provides that the repairs put upon such a vessel shall be "equal to three-fourths of the cost of the vessel when so repaired," to entitle her to registry or enrollment.

I have no hesitancy in answering your first question in the negative.

You also ask "what rule may be followed in determining the proportion, if any, of the cost of repairs made soon after January 20, 1903, which may be aggregated with the cost of subsequent repairs?"

The answer to this question may be found in the reasons assigned for the answer to first question. The statute contemplates one wreck, and if the repairs—temporary and permanent—occasioned by such a wreck equal three times the actual cost of the wreck, she is entitled to registry or enrollment, provided the other conditions of the statute are complied with.

SIMPLICITY IN WARSHIP DESIGN.

In a recent issue the Review gave a fairly complete account of Mr. George W. Dickie's paper on "Simplicity in Warship Design," which was read before the Society of Naval Architects & Marine Engineers. It now concludes it with a discussion of evaporators and electric plant as follows:

"The handling of water leads to the arrangements for producing fresh water. I do not propose any change in the arrangement of evaporators and distillers as now fitted. I have, however, changed the location that is usually assigned to this plant from aft of the boilers to forward of the boilers in the place usually occupied by the dynamo rooms. The evaporator room is better forward, as the fresh water storage tanks are generally located there, but the principal reason is that I have found it necessary in my search for economy and simplicity to locate the dynamo room between the engines and the boilers.

"There would be two evaporator rooms, the space being divided by the central passage. They would be entered from the forward fire rooms and also through the hot air escape trunks, one from each room being carried to the weather deck. Fresh air will be received from the central passage on the floor line, which will be carried across to the outboard side with outlets arranged so as to best carry the heated air to the upcast trunks. Watertight closing valves for the air ducts will be on the inside of the passage and under control of the man in the passage in charge of ventilation.

ELECTRIC LIGHT AND POWER PLANT, ETC.

"Electric light and power plant and questions affecting the generation and distribution of electricity, either for lighting or power purposes, have come to be very important on naval vessels. I believe, however, that in the latest designs for naval vessels the power of the generating plant is much in excess of the actual requirement. It is not conceivable that all the electrical appliances on board a naval vessel can be operated at the same time, or that all of them in operation at any time can be working at their full capacity. In the armored cruiser we are considering, it is possible that there might be required in time of action, provided everything that could be used at such time were in full operation and all working at their utmost capacity, power developed as follows:—

"If every electric light in the ship were turned on, 100 H. P. Should all drainage pumps be working to their full capacity, 60 H. P. All ammunition hoists working at their full capacity, both turrets rotating at their highest speed and their ammunition hoists all working at the same time and with their carriages loaded and running up, 54 H. P. Steering gear, putting the rudder head over, 25 H. P. Ventilation, 60 H. P. Now this is the utmost possible in time of action, and under circumstances entirely improbable, yet the aggregate is but 384 H. P., and I have provided four units of 100 K. W. each, which will provide power to operate everything that can possibly be worked at the same time and have one unit idle. Should the vessel be coaling the possible power required would be: For lighting, if all lights were on, 100 H. P. For seven winches, all hoisting at the same time, 175 H. P. Ventilation, 60 H. P. There might be 10 H. P. on drainage, making a total of 345 H. P., somewhat less than the possible power in action. I cannot conceive of any condition that could possibly require more than three 100 K. W. units in operation, and accepting that as equal to the highest point under any condition, an installation of four such units is an ample provision for electric power. This installation would be provided in two independent dynamo rooms, located on each side of the central passage, between engine and boiler compartments, directly over the pump rooms already described. This location has many advantages of the usual position forward of the boiler compartment. In recent installations, independent

condensers and air circulating pumps have been installed in the dynamo rooms. This arrangement involves very long discharge pipes between the air pump at the dynamo room condenser and the feed tanks in the main engine room. In a case I am now engaged on the distance is 162 ft. This I think will be sure to give trouble. Located as I propose, the dynamo engines will exhaust directly into the auxiliary condensers in the pump room below. This also very much reduces the amount of auxiliary steam and exhaust piping. Each dynamo room would have a ventilating shaft, extending directly up to the weather deck. Fresh air would be taken from the central passage at the floor line and below the working platform. The air inlets, one at the forward and one at the after end of each dynamo room, would be fitted with watertight valves under control of the ventilation man in the central passage. The fresh air would be liberated at the proper points at the floor line so as to force the heated air up the ventilating shaft. There would be a switchboard in each dynamo room located against the wall of the central passage. All light and power circuits would be carried along the central passage and distributed by vertical conduits to all parts of the vessel where required. One-third of the electric power is applied direct in the central passage. The conduits will be carried along the sides of the passage and all branches will either go through the sides or the roof, through watertight stuffing boxes. The object, as far as possible, would be to have all horizontal conduits in the central passage and the branch conduits from there supply light to a very limited area each, or power to one unit. This will greatly simplify the wiring and secure it as far as possible from damage in action; faults would be more readily located and repairs much more easily effected.

"The electric ammunition chain hoist as now fitted in our naval vessels is a well designed machine, weak points in its mechanism are being strengthened as defects develop, and I think it can safely be accepted as a very satisfactory application of electric power to hoist ammunition. Wiring these machines from the main circuits in the central passage will consist of simple short transverse branches that will be very simply installed.

"As to horizontal transportation of ammunition from the magazines to the vertical chain hoists by electric travelers, as some of the latest specifications require, I expect that many difficulties will have to be overcome before any marked success will result from the efforts to provide electrical horizontal transportation, where many watertight bulkheads must be passed through and the integrity of each compartment must be maintained and delivery made at many points. I have removed everything but the trolley rails from the ammunition passages, and with a clear run-way for the transportation of the ammunition there should be no difficulty in getting the ammunition as rapidly to the hoists as they can handle it and with a reasonable number of men. It may yet be possible to stow ammunition for big guns on a continuous belt that could be drawn continuously through a trunk either horizontally or vertically, or both, as required, to each gun station; but as it is now I believe that the transportation and hoisting of ammunition will be found to be more than equal to any requirements of actual naval fighting. Most ships can now deliver all the ammunition they carry to the guns in about one hour.

"Naturally the methods of handling means for destroying life on a warship have been brought to more perfection than the methods of handling the means for saving life, the design of the ship favoring the one more than the other. Boat handling on the warship is a more difficult problem than the handling of boats on a merchant ship, where the boats extend along the side in a single row, and are all practically the same in dimensions and weight and can therefore be handled by

the ordinary davits and tackles. In the warship an extended line of boats along the side is not admissible. They must be grouped at points where they can be stowed clear of guns and other obstructions. The boats also differ in weight from a 600 or 700-lb. dinghy to a 3,300-lb. steam vidette, and in length from 20 to 50 ft. The boat cranes as now fitted are fairly satisfactory, but owing to the large over-reach, due to having to sling the boats from one point, this also increases the height, especially if the boat to be handled is long. I have shown cross girders fitted over the boats on the bridge deck plan and on the inboard profile. Also a detail of the outboard end of the girders. This portion of the girders is hinged and swings inboard when the boats are housed. The boats are lifted at each end as with the ordinary davit, the hoist being enough to pass one boat over another, the trolley over each end of the boat having a transverse sufficient to lift the boat from where it is stowed and lower it over the side into the water, the movement of each trolley being controlled by the hoisting mechanism. Three sets of hoisting mechanisms would be arranged to handle the three groups of boats. The boats would be arranged in the groups according to their weight, so that each set of hoisting gear would be proportioned to the height of the boats in the group. I am not prepared to claim that the boats can be better handled by the girders and trolleys, as shown, than by the cranes now fitted. For large boats the cranes must also be large, and the great reach of jib required makes them unwieldy to handle. I have not been able to work out the plan shown in detail so as to be entirely satisfactory to myself. Perhaps the discussion on this paper will bring out something that would promise a better solution of the boat handling gear on warships than what I have suggested. Something less cumbersome is needed than the cranes now fitted.

COALING.

"It was my purpose to utilize the boat hoisting gear by having special rope drums fitted for coaling purposes. The modern warship, being of high power, uses a large amount of fuel and must coal frequently. The coaling arrangements are therefore of considerable importance. These arrangements should be such as to insure the coal being delivered to the bunkers in the shortest possible time, this being an important factor in the fighting power of the ship. The coal should be handled as little as possible and the coaling should be effected with as little dust as possible. Fuel oil would solve all the difficulties about handling coal, if it were as safe when in the bunkers as coal, and if it could be got at all places where the warship has to coal. In many respects it is the ideal fuel for the warship, and should it be adopted the coaling problem would be solved. The warship hardly ever coals at a dock, and usually coals from barges that are not provided with the means of hoisting. If the coaling is done from a coal ship alongside, the coal ship is usually provided with the means of hoisting. I have endeavored, in designing coaling arrangements for the type of ship used to illustrate this paper, to arrange the method of receiving the coal on the warship so that it would be equally convenient either to hoist it by the ship's appliances from an ordinary coal barge, or receive it from the coal buckets of a vessel alongside. In arranging the structural work of the ship, the coal chutes built as part of the vessel are carried out to the side and extended up to the weather deck and fitted with portable hoppers, into which the coal is dumped, see plan 4. This is the most convenient place to have the coal chute, either from the dock, if the vessel be coaled there, or from a coal ship alongside. While it is especially adapted to the method I have shown of coaling from barges alongside, the arrangement I have shown consists of portable guide rails attached to the side of the ship and extending above the deck line a sufficient distance, supported by two stanchions, as shown, to form the guides for

a self-dumping bucket. The bucket will run down into the coal barge without coming out of its guides, would be of not less than one-half ton capacity and might be larger. The ship would be furnished with not less than three sets of rails and buckets for each side with all the necessary gear to operate them. The men filling the buckets would have a few seconds rest as each bucket was hoisting, dumping and lowering again for another load. Each bucket should handle easily 25 tons an hour, or 150 tons an hour with all buckets going. There would be very little coal dust from this method of handling and none inside the ship, nor would the stowing of the gear require more space on board the ship than the method now provided for handling coal on similar ships, where the method consists of erecting special coaling derricks on deck to hoist the coal from barges alongside and swing it into the coal chutes.

"A similar ship I have in mind is furnished with fourteen coaling derricks, each requiring three posts and a swinging boom. This certainly will require as much room for stowage as the six sets of guide rails and six self-dumping buckets. While the arrangement of coal chutes gives the most convenient locations for all the different kinds of coaling, I may not have succeeded in showing the best possible coaling device to meet all the requirements of coaling a warship under all conditions, but if the plan I propose gives such suggestions as will result in having the problem thoroughly discussed, I will be satisfied.

"The boat handling and coaling arrangements are no part of the method I have had in mind for relieving the complication on board warships, and simply were considered in preparing the plans for this paper and were introduced into this paper simply to widen its scope. What I have suggested may bring out something from experts in this line of mechanics that may be of real use in connection with the problems involved, as they affect warships.

"I asked an officer the other day, who had had considerable experience as executive on the largest warships, to mention some of the unnecessary things now fitted on these vessels that would be better left out. He replied that he could prepare such a list, but it would be such a lengthy one that I would be more surprised than instructed when I got it.

"I have tried in this attempt to find simpler methods for reaching the desired result on warships, to omit nothing that really needs to be done. The methods I propose have received much thought during the past ten years. All matters that I have connected with the central passage idea I have worked out in detail and know that they can be successfully incorporated into the design of these ships without in any way detracting from the fighting qualities of the ship or curtailing in any way the space needed for engines, boilers, magazines, etc., under the protective deck. I do not expect that many will concur in the innovations I propose. I have come to my present position in regard to the subject-matter of this paper through long and hard battling with the problems presented, but I do expect that the subject I have endeavored to present will be thoroughly discussed by the many members, whom I know to be well qualified to express opinions on the matters I have endeavored to bring before the society. There can be but one opinion in regard to the importance of the subject, and all are alive to the necessity of finding simpler means of reaching desired results on our modern ships of war."

The bureau of construction and repair of the navy department has just assigned Com'dr J. T. Newton to additional duty as general inspector of naval vessels building by the Bath Iron Works, The Fore River Ship Building Co., and the Newport News Ship Building & Dry Docks Co.

W. A. Boole & Son, San Francisco, intend to enlarge their plant to a considerable extent.

THE LIGHT OF PUBLICITY

Beats Down Upon The American Maritime League of 115 Broadway, New York, and Does Not Improve Its Looks—Only Two Members Present.

In its last issue the Marine Review related what it knew of the American Maritime League of No. 115 Broadway, New York. The Review has received letters from a number of distinguished men throughout the country whose names were used as vice-presidents and members of the advisory board of this league, stating that they were but little acquainted with it and really did not know that their names were being used in these capacities, though vaguely remembering that they had received letters at some time past from the promoters of such a league. The American Maritime League appears to have been organized in the spring of 1904 by H. K. Pommery and to have had associated with him S. Elliot Curtis and Kent Holmes. Curtis now represents that he severed his connection with the organization about a year ago and Holmes disclaims any knowledge of ever having heard of it. The attention of the Review was drawn to the existence of the league last fall when the Merchant Marine League of the United States was projected in Cleveland by merchants and manufacturers of the middle west. The result of its investigations were briefly mentioned in the last issue.

Three weeks ago articles were sent out from Washington concerning the American Maritime League, the tenor of which indicated that it was a totally new enterprise and had been called into being by the failure of congress to pass a shipping bill at its last session. The same list of distinguished men who had previously disclaimed all connection with it were again used as vice-presidents and members of the advisory board and the boldness of the publication aroused the indignation of those whose names had been used without their sanction and the demand for an explanation became so insistent that former Senator John M. Thurston, who was induced to take the presidency of the league by Pommery, called a meeting of the American Maritime League to be held at the Waldorf-Astoria in New York on Friday last. No one appeared except Thurston and Pommery, but really those who had been watching the affair for some months past expected that no one else would be present. The financial showing made was not at all business-like. While the receipts were represented to be \$2,830 since the organization of the league, no vouchers were submitted to show how the money had been expended. For instance, office rent in New York was down for \$200, but no rent receipts were attached and the agents of the building say that no rent was paid. The report of the meeting is very well told by the Philadelphia Press and is as follows:

Like the boy who stood upon the burning deck, whence all but him had fled, ex-Senator John M. Thurston, president of the so-called American Maritime League, held forth at the Waldorf-Astoria today in the vain hope that some of the gentlemen whose names have been sent broadcast throughout the land as officers might appear and help him to complete a permanent organization.

For one full hour the senator sat alone in the sumptuously decorated banquet room of the hotel with one eye on the door and the other suspiciously contemplating the grinning countenances of a score of New York newspaper men who had come fully prepared to take copious notes of the much-heralded meeting. Every once in a while a young man, clean shaven, slight of build, who did not appear to be much over thirty years of age, and whose movements were exceedingly nervous, flitted in and out and whispered something into the senator's ear.

This young man, it was afterwards learned, was H. K. Pommery, the individual whose name was signed to letters seeking subscribers to the league fund, and who is down on the records of the organization as its secretary. He and

Senator Thurston were the only two who responded to a call for the meeting, notices of which had been sent to no less than 150 so-called members and officers.

It was only when the reporters, after long waiting, got together in one corner of the room and appointed a spokesman that Senator Thurston made his next move. It was as grotesque as the league heretofore has been mysterious. Calling the newspaper men to a long table in the center of the room and placing Pommery, with a huge collection of letters on one side of him, he rapped on the table and declared the meeting open.

Then he gave one of the prettiest farces ever enacted in the name of parliamentary usage. Looking into space and over the heads of the newspaper men who, beside himself, Pommery, and a stenographer, were the only human beings present he began an elaborate address to an imaginary body of the league's members. He defended his position as president of the league, recited the criticism that had been heaped upon it through the facts made public by "The Press," defended Mr. Pommery and his methods and declared that only \$2,830 had been received, every cent of which would be accounted for.

The senator's style was parliamentary in the extreme. Newspaper men glanced about uneasily in the hopes of catching sight of some member and not a few grinned, but the speaker went on undisturbed and tranquil as a summer day. Once, when interrupted by a question, he parried the would-be interviewer and declared his object was to make all his statements a matter of record and that he would submit to be questioned "after the meeting." After that he was allowed to proceed in his own way.

"I have called this meeting," he said, "to consider what steps, if any, should be taken to continue and complete the organization of this league. More than one hundred notices were sent out to members and officers, but there appears to be present only myself, the president of the league, and Mr. Pommery, the secretary."

The senator, then waiting for the stenographer to get ready, squared his shoulders and in an impressive way began the reading of a paper, directed "to the officers and members of the American Maritime League."

After telling how he had become a member and later head of the league, which he recently narrated in an interview printed in "The Press," he continued:

"Recently criticisms have appeared in a newspaper as to the manner and method of the organization of the league and the work in connection therewith, as it had been carried on by its secretary.

"This criticism has led me to investigate and from my personal investigation I have no hesitation in stating that it fully appears that the use of every name in connection with the official list of the league has been authorized in writing by each person whose name has been used; that all, or nearly all, of said persons had authorized the use of their names as such officers and their names had been used as such officers long prior to the time when I accepted the presidency, and I now am confirmed in my original judgment that I was justified in accepting the presidency of the league upon the authority of the distinguished men who were, prior to the 13th day of December, 1904, its officers.

"Upon further investigation of the affairs of the league, as shown by the records in the office of its secretary, I have no hesitation in stating my belief that its secretary, Mr. H. K. Pommery, has been most active and energetic in its organization, and that his work so far has been all, if not more, than could have been expected in connection with the preliminary work of perfecting an organization of this kind.

"Mr. Pommery is here prepared to verify my statement as above, that the use of every name upon the official list of

the league has been authorized over the signatures of each of the individuals therein named.

"He will submit to you a list of the names which have been used as officers of the league, together with the dates of their special acceptances of the positions.

"He is also prepared to verify this statement by presentation of the letters of each of the said persons accepting office in the league organization. He also will present to you a complete list of the membership of the league, showing the amount of membership fee paid by each member.

"He is also prepared to make to you a full and detailed account of all the money received by him for subscriptions to membership in the league, which amount is \$2,830. His account, I think, will show that his expenditures have been properly and carefully made, that no one has received from the funds of the league any sum of money except for proper services duly rendered and that any amount over and above such expenditures is far less in amount than would reasonably compensate him for his one year's effort in behalf of the organization of the league.

"In my judgment the time has come when those who have lent the sanction of their names to the organization of this league must determine as to which one of two courses shall be henceforth pursued.

"First, and I believe the best, is to effect a permanent organization of the league, to elect a president, secretary and treasurer, to order that all moneys collected shall be turned over to the treasurer and paid out only upon the order of the proper officers of the league; that efforts be made to secure sufficient funds to carry on an educational campaign throughout the country, secure the co-operation and indorsement by resolution or otherwise of the various trade and other organizations of the United States, to arouse the American feeling in behalf of the object desired, and perhaps to arrange for the services upon the platform of distinguished speakers, who will personally present to the people the necessities for congressional action.

"I believe that great services can be rendered by such a league as this, so arranged and carried on.

"If this is not to be done, the time has come when this organization should be dissolved. If it is to be dissolved, I am of the opinion that every man who has sanctioned the use of his name as an officer of this league is morally responsible to every subscriber for every dollar that has come into the treasury of the league, and for my own part I accept this responsibility as to every dollar that has come into the funds of the league since my acceptance of its presidency, whether or not that responsibility is acquiesced in or will be shared by any of the other officers of the league."

When the senator had concluded the reading of the document he called for Mr. Pommery to produce the letters "over which," he said, "there had been some question."

Mr. Pommery, as a witness on the stand, guided by his own lawyer, then produced letters as the senator read from a list of fifty-seven "officers." Letters from men like August Belmont, Cornelius N. Bliss, Rev. Thomas J. Conaty, Secretaries Taft, Morton and Governor Douglas, Thomas Dolan, Timothy L. Woodruff, Elihu Root, ex-Governor Murphy, of New Jersey; General B. F. Tracy, ex-Attorney General Griggs, Governor Herrick of Ohio; President Harper of Chicago University; Mayor McClellan of New York, and a dozen others were read endorsing the movement and "agreeing to the use of their names." The senator checked them off and turned a triumphant eye on the newspaper men as they were read and passed around for inspection.

A moment later his face assumed a serious expression when the newspaper men asked how the letters were worded which secured these names. Mr. Pommery looked to the senator

before answering and then replied that he was unable to supply a copy of these earlier letters.

Finally came a letter from "A. Courtlandt Van Rensselaer."

"May we ask who is A. Courtlandt Van Rensselaer?" asked several newspaper men.

"He is not the Philadelphia man of that name," said Senator Thurston.

"Do you know who he is, Mr. Pommery?"

Mr. Pommery shook his head. He believed the gentleman "was connected with a railroad somewhere." He had "looked him up" and "found him all right."

This name, "A. Courtlandt Van Rensselaer," deluded many into the belief that it was the distinguished Philadelphia citizen of that name. The letter from "A. Courtlandt Van Rensselaer" was dated Stockbridge, Mass.

Senator Thurston descended from the "dignified" pose he had assumed earlier, and consented to answer any question bearing on the letters.

"These letters are signed 'S. Elliott Curtis,' Secretary. Can you tell who 'Curtis' is?" the senator was asked.

Mr. Pommery was called to the stand.

"The use of Mr. Curtis' name was most unfortunate. He was simply an employe of mine and I allowed him to sign the first letters."

"What were you at the time he was acting as secretary?"

"I was organizer."

"On whose authority did you organize the league?"

"I acted wholly on my own responsibility."

"Who was associated with you at the beginning?"

"Well," slowly answered Mr. Pommery, "there were only myself and Curtis at the start."

"Then as a matter of fact you two decided to start the league and sent around these letters to secure the names of leading men as vice-presidents?"

"That's about the size of it," answered Pommery.

"A matter of fact you had no organization at the time, and have never had a meeting until today?"

"If you want to put it that way, no."

"How did the letters read which asked Mr. Thurston to act as president and which induced him to accept the office?"

Mr. Pommery was backed up in his refusal to answer the question by Senator Thurston, who said they were of a personal character.

"Many of the gentlemen who allowed the use of their names declared they did not know that the names were to be used to secure money from others. How do you explain that, Senator?"

"I do not know how the original letters read," replied the senator. "Pommery may explain that."

"Those letters were sent out by Curtis," replied Pommery, "and I do not recall just how they read."

A list of about 150 names of members with the amounts they had subscribed was then "offered" and ordered to be placed on the record, after which Mr. Pommery read his report of the receipts and expenditures. This was as follows:

Receipts from all sources\$2,830 00

Expenditures:—

Legal services, John W. Hutchinson, Jr.....	200 00
Press agent work, W. W. Smith, Washington.....	100 00
Clerical work, S. Elliott Curtis, 11 weeks at \$12.....	132 00
Secretary at Washington for four weeks.....	100 00
Stenographer at Washington, four weeks.....	42 00
Typewriting and stenography during year.....	132 73
Office rent, New York, one year.....	200 00
Office rent, Washington, two months.....	40 00
Telephone for one year.....	100 00
Post office box, New York, 1½ years.....	24 00
Rent of typewriter machine (Washington).....	15 00
Stationery (cards, card case, files, pens, inks, letter heads, envelopes, etc.)	50 00

(Continued on page 32)

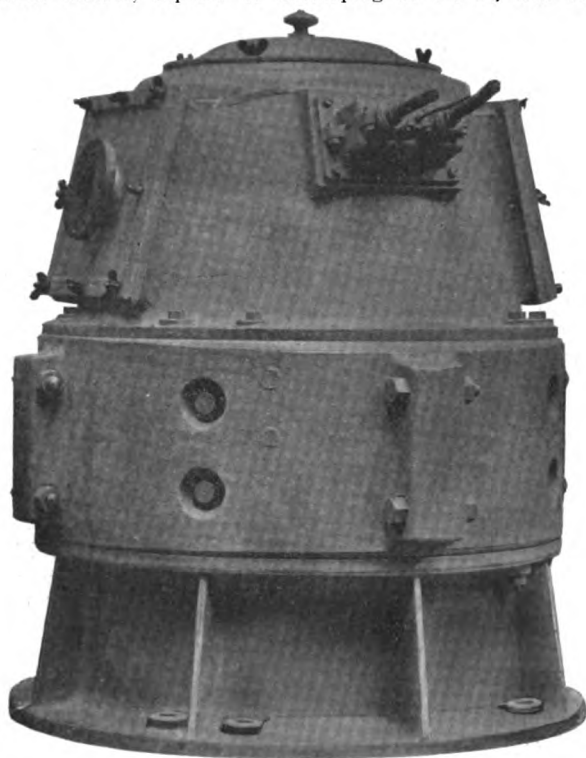
ELECTRIC PLANT ON THE GROMOBOI

By Emile Guarani.

Everyone has heard talk of the valiant but unfortunate vessel Gromoboi of the Russian Vladivostock fleet; it has been intimately connected with the latest important events that have taken place in connection with the Russo-Japanese war. The electric fittings of this cruiser have been supplied by the Compagnie de l'Industrie électrique et mécanique of Geneva. Electricity is used for working the capstans, the pumps, and the ventilators, and also for lighting and a number of other uses. For working the capstans there is a continuous current motor of constant power, capable of yielding for the time being 150 H. P. at 100 volts and 350 revolutions per minute.

This motor has six poles and is provided with carbon rubbers upon the collector, and with ring lubrication; the windings are of the shunt type. The frame has been made suitable for the direct coupling of the motor to the capstan.

For working the rudder there are two six pole continuous current motors, capable of developing 80 H. P., and of a



HERMETICALLY CLOSED 30 H. P. VERTICAL MOTOR DRIVING PUMPS ON THE RUSSIAN WARSHIP GROMOBOI.

constant power of 60 H. P. at 100 volts and 110 revolutions per minute. The winding is also of the shunt type. The rubbers are of carbon and the lubrication is automatic as is the case with all the other motors. The motor is fitted with reversing gear and is coupled direct to the rudder. There are also two motors with radiant poles capable of developing 6 to 8 H. P. at 100 volts and 600 revolutions per minute.

The working of the windlass is effected by a motor of the suspended type for continuous current with power of 60 H. P., at 100 volts and a speed of 350 revolutions per minute.

For other divers purposes there are two electric flywheel motors with a power of 8 H. P. and making 600 revolutions under 100 volts, intended to be used for various purposes. These motors are specially thought out and arranged for easy transport.

As regards the driving of the pumps there are eight continuous current motors of the vertical type with radiant poles, adapted for a power of 30 H. P., a tension of 100 volts and 500 revolutions per minute.

The motors, all hermetically closed, are coupled directly to the pumps, and also two motors, vertical type, 15 H. P., with radiant poles, making 600 revolutions per minute at a tension of 100 volts. These motors are also hermetically closed as they have to be placed in very damp positions, and they must even be able to work in the water if required.

Finally, ventilation is assured by a certain number of Sulzer ventilators driven by completely encased motors, notably by two motors with radiant poles of 7 H. P., making 600 revolutions under 100 volts; these motors actuate ventilators capable of dealing with 12,000 m.3 of air per hour, under a pressure of a column of water of 60 mm. Three motors similar to the above with small steam motors as a reserve are provided in case there should be any lack of current. The constants are the same as those for the two first motors used for the ventilators. Three encased motors with radiant poles, of 3 H. P. rotating at 1,000 revolutions, under 100 volts, are used to actuate suction fans capable of forwarding 6,000 m.3 per hour under pressure of a column of water of 40 to 50 mm. Each motor comprises a complete outfit of accessories, i. e. a starting device, a device for counting the number of revolutions and a board comprising an amperometer, a voltmeter, switches, cut-outs, etc., and the principal reserve parts.

OUTLOOK FOR LAKE TRADE

Buffalo, April 18.—With the labor problems on the lakes all settled for the season and perhaps as favorably to the vessel owner as was possible considering the former aggressive stand made by the men, the fleet being now more or less active, the next step is to size up the season as far as possible, to see if there is anything in it for the owner. It may be said at the outset that there is not much in sight for the lumber carrier. The amount to be moved is steadily growing smaller. Buffalo and the Tonawandas are now receiving a little more than 600,000,000 ft. a season, which is scarcely more than half the amount received ten years ago. Besides there is a certain big individual barge interest that has of late done much in undermining the fleet in general. A year ago an ambitious Buffalo barge captain paid \$1,000 for a final quarter interest in a barge. He put her in his tow and when the season was over he confessed that she had earned him only \$75 for the season.

The grain trade is far from what it used to be, but it is mainly on account of the greater amount of tonnage available. The great steamers, though built for carrying ore, are capable of slaughtering that trade in a week at any time. The grain is a good thing to piece out with and it is not in disparagement of it that the above remark is made, but supposing that the former grain crops are back with us again this season and Buffalo receives her former average of 100,000,000 bushels, she exceeded twice that amount in 1898, we shall have to reflect that a steamer in Chicago loaded 400,000 bushels the other day. It would take just 250 such cargoes to make up a fair average season for Buffalo, which receives most of the lake grain. This also leaves out the small steamer, that is, in these days, one carrying say 100,000 bushels, just as the 50,000-bushel steamer used to rob the canal schooner of 20,000-bushel capacity in the not far distant day when there was grain to contend for in Toledo.

The package-freight trade is quite by itself and more a railroad matter than otherwise and besides has changed less than other branches of the trade of late, so it devolves on the ore trade to help out the fleet if it is to be done. There seems to be little doubt that the natural demand for ore is large enough to make a profit for the fleet if the business is properly handled.

For it seems to be agreed that the iron trade will be able to take care of 30,000,000 tons of ore if it is brought down,

and of course the fleet can move it if it has a chance, though not if it must lie in port a week or so every time, waiting for the receiving docks to make room for it. There is a good amount of effort making to meet this requirement, but the question as to how far it can be carried out is hardly to be answered before the end of the season. It would not be strange if the lesser, but ambitious ore ports, such as Buffalo, would make comparatively more progress than the great ports, for it seems to be about out of the question to make the large docks any faster than they are now.

Buffalo is doing considerable in that line and when the season is well under way there will be more capacity for storage than there is now. A most commendable plan is under way of building a big ore dock with a basis of bed rock. We have suffered three or four times since we began to handle ore extensively from the sinking of piles, all of which were more or less disastrous incidents, so that it is now known that a soil or concrete foundation is not sufficient if there is quicksand in the vicinity or a pool of soft matter, as seems to be the case here and there at South Buffalo.

When the ore pile that went down so suddenly at the Steel Plant made its big drive into some movable material it was supposed that there would be a bulge to correspond somewhere on the earth's surface not far away, but search failed to find any disturbance, so it is supposed that the odd sort of shot was fired out into the lake somewhere. So it seems that this lake season, as well as future seasons, at least in the minds of well-posted ore carriers, depends largely for success on the independent ore pile, that can be used to supplement the regular one whenever it is needed. If it is not provided there may be ore enough brought down to satisfy the trade, but it will hardly be made on short trips enough to insure a profit to the carrier.

"What we are going for next," said an ore carrier the other day, "is ore rates free of handling, just as with coal. Then we can figure. As it is now we must make the ore rate before we know what the handling charges are to be."

Little need be said on the coal-freight situation in this connection. A good amount will be moved and it pays. Quick handling is the rule. It is the ore situation that troubles the carrier just now most of anything.

JOHN CHAMBERLIN.

RAILWAY EARNINGS DURING 1904

The preliminary report of the Interstate Commerce Commission giving the earnings of practically all the railroads of the United States for the fiscal year ending June 30, 1904, shows some very important changes in the cost of conducting the railroad business. The figures for the 1904 fiscal year show the results of the operation of 209,000 miles, as against 205,313 miles for the preceding year. The totals for 1904 are as follows: Gross earnings, \$1,966,633,821; operating expenses, \$1,332,382,948; income from operation, \$634,250,873.

The gross earnings for 1903 were \$1,900,846,907, or an increase for the year 1904 of about \$66,000,000. Operating expenses were \$1,332,383,948 in 1904 as against \$1,257,538,852 in 1903. The ratio of operating expenses thus increased from 65.16 per cent in 1903, to 67.75 per cent in 1904. This increase in the cost of operating the railroads of the United States is of particular interest at this time. It resulted in a decrease of the revenue available for interest charges and dividends of something over \$5,000,000, the net earnings in 1904 being \$634,250,873 as against \$640,644,138 in 1903. In other words, while the railroads sold over \$66,000,000 more transportation than in the preceding year, the actual returns, as regards the owners of the railroads, diminished \$6,000,000. The figures of the Interstate Commerce Commission, demonstrate on their face, therefore, that the public received cheaper transportation, and the relative proportions of profit to the railroads materially diminished.

REPORTED PURCHASE OF BERTRAM'S

The reported purchase of the Bertram Engine Works, Toronto, by the Canada Foundry Co., cannot at present be authoritatively confirmed. It is, however, understood that the Bertram Works have been acquired by a syndicate headed by F. Nicholls, Toronto, which controls the Canada Foundry, the Canadian Ship Building Co., the Electrical Development Co., which is developing power at Niagara Falls, and several electric railways, and members of which are interested in the Canadian Lakes and Ocean Navigation Co. What it all points to the public are left to conjecture. The principal apparent cause for the purchase of the Bertram yard by the interests which control the Canadian Ship Building Co. is the closing of a contract by that company to build a steamer for the Niagara Navigation Co. This steamer could not be built at the company's yards at Bridgeburg on Lake Erie, as she would be too large to be brought through the Welland canal. A yard or building facilities on Lake Ontario were necessary, and as Bertram's is somewhat cramped for space the purchase was arranged; the engine works part of the business being transferred to the Canada Foundry Co.'s plant, and the ship yard being utilized for building the Niagara Co.'s steamer, and held in readiness for repair and building work this side of the Welland canal.

CAPT. JAMES B. FOOTE ON LAKE TRADE

Capt. James B. Foote, marine superintendent of the Canadian Lake & Ocean Navigation Co. of Toronto, while in New York last week spoke with great intelligence regarding the coming season on the great lakes. He stated that the season of 1905 would be one of the busiest in the Canadian Lake marine, basing his assertion on the fact that 30,000,000 tons of iron ore had practically been contracted for delivery to lower lake ports and that while the movement of Canadian ore would only be a fraction of this stupendous total, still as it would be carried almost wholly in Canadian bottoms it meant good business for the Canadian marine. Commenting on the grain trade Capt. Foote stated that Canadian tonnage was quite sufficient to handle all of the northwest grain. He spoke with confidence of the possibilities of the freight route established last season from Montreal to Fort William. Regarding the efforts of vessel owners to secure legislation to revise the average and shortage grievance he stated that it had failed because of the hesitancy of men within the ranks. Whatever difference exists between the bill of lading and the actual cargo is charged against the vessel. Sometimes it is in favor of the vessel, but in the majority of cases it is against it. Of course, no vessel leaks grain through its seams and the mistakes are doubtless those of the weighmasters. Any loss in transit should not amount to a half bushel in a thousand bushels due to the accumulation of dust, but at the close of the season several owners found themselves short on delivery in amounts varying between 900 and 3,000 bushels. Such loss, of course, is serious as the price of grain per bushel is charged against the vessel. Other owners, however, found themselves ahead and were indisposed to take action, and the entire matter was left in abeyance.

The officials of the United States Revenue Cutter Service state that the Revenue Cutter Apache which was recently rebuilt at the Cramp Ship Yard at Philadelphia, is now fitting out at the revenue cutter service depot at Arundel Cove, near Baltimore. The cutter has been changed from an antiquated to a thoroughly modern vessel, alterations in her propelling machinery having increased her speed from 10 to 14 knots. She is now accounted one of the best vessels in the revenue cutter service and when work has been completed upon her cabins will probably be assigned to duty on the gulf with headquarters at Galveston.

The Light of Publicity*(Continued from page 29)*

Postage on letters to members of Congress, acknowledgments, notice of meetings and regular correspondence for one year	100 00
Directories and work collecting names.....	50 00
Printing, etc., Fleming Press, printing.....	90 00
E. J. Hall	42 72
E. J. Hall, stamps for 1,100 letters.....	88 00
D. S. Adams, printing.....	184 87
B. S. Adams, stamps	177 00
Press clippings	10 00
Traveling expenses	400 00
Incidentals	100 00

Total\$2,378 32

Balance\$ 451 68

A glance at the above "report" shows where the money of the subscribers has gone—money intended to promote the up-building of the American Merchant Marine.

There is an item of \$200 for office rent in New York, and yet the agents at 115 Broadway declare that the single room there was shared by a half a dozen and that Pommery got a three days' notice for non-payment of rent. Mr. Pommery made no effort to explain the item of \$200 for "legal services," the typewriting and stenography items; the postage costing \$88 and the traveling item of \$400. He said the league's bank of deposit was the City Trust of New York.

"Has any officer of the organization received one cent of compensation?" asked Senator Thurston.

"No," replied Pommery.

Every once in a while the senator would forget Pommery's name and address him as "Curtis," when the dapper secretary would rise, correct the mistake and be seated again.

Mr. Pommery then rose and read a long paper, which was practically a defense of his position. He said thousands of letters has been sent out, circulars mailed and congress canvassed. It was the idea to divide the whole country into districts and appoint an agent over every block of five districts, the subordinates to report to the main office at Washington. Eventually the league was to publish a magazine which would add largely to the revenue of the organization.

On orders from Senator Thurston, as president, he had issued notices for 150 members to attend today's meeting, but could not explain why no one but himself and the senator attended.

Senator Thurston then concluded "the meeting" with a reiteration that no name had been used without sanction and that only three resignations had been received. He then declared his intention "to stick" and reorganize the moral and financial responsibility that accompanied the use of his name.

"I accept this responsibility," he said, "regardless of whether any other gentleman who has allowed the use of his name as an officer of the league joins with me in accepting such responsibility. That is a matter for each man who has allowed such use of his name to determine for himself."

The senator then declared he would give "these other gentlemen" one more chance to say whether or not the league shall go on, and he appointed Saturday, July 1, for the next meeting at the Waldorf.

"I shall hold myself personally responsible," he concluded, "for every subscription that has been secured since my name was used as president and if any subscriber feels that he was led to subscribe through any misconception his money shall be refunded. "Meanwhile I direct that further solicitations for membership be discontinued until the next meeting, and that all subscriptions in the mail or received hereafter shall be turned over to me to hold until that meeting in trust for the subscribers. I do not do this because I have any reason to doubt the honesty or efficiency of the secretary."

"What will you do if today's performance is repeated at the July meeting?" Senator Thurston was asked.

"Well, I can't keep the league up by myself," he replied. "If the July meeting is no better attended than this we shall have to dissolve. That's all."

During the day it was learned that the postal inspectors had been working on the case of the league and gone as far as to hold up all its mail coming into the New York office. In this mail, it is said, are the resignations of leading men who declare they joined under misapprehension.

When Senator Thurston was told of the postal authorities' action, he said:

"I shall notify the postmaster general at once to release all this mail and have it sent to me. If there are any checks they will be held until the July meeting."

Before leaving the hotel Senator Thurston was asked:

"How do you account for the fact that not one solitary officer or member attended the meeting save yourself and Mr. Pommery?"

"I simply can't explain it."

AROUND THE GREAT LAKES

Capt. Albert Fitts has been appointed harbor master at Toledo.

Seymour Jerome has been appointed harbor master at Ashtabula.

The White Star Line of Detroit will open its Toledo division on April 26 with the steamer Owana.

The steamer Frontenac has been sold by the People's Transit Co., Chicago, to Henry Burger, of Manitowoc, for \$18,000.

It is reported that the Pacific Dispatch Transportation Co. of Tonawanda is to build six canal boats for service on the Erie Canal.

The steamer P. P. Miller loaded 195,000 bu. of corn at the Rialto elevator in Chicago in two hours and forty-four minutes last week.

The steamer Northern Wave, bound down, crashed into the draw bridge at Houghton last week throwing the draw entirely over into the lake.

The passenger steamer Iroquois has been chartered from the Craigs of Toledo, by the Dunkley-Williams Co. for the Chicago-South Haven run.

Work upon deepening the harbor in Port Arthur, Lake Superior, will be begun by the Dominion government as soon as the ice is out of the way.

George Karstens, formerly engineer of the big wrecking tug Saginaw and Wales, has been appointed chief engineer of the new Canadian cruiser Vigilant.

Capt. W. D. Ames of Cleveland was in Bay City last week looking after the two steamers Sylvania and Socopa building at that yard for the Tomlinson interests.

The formal opening of the new ship canal leading to the plant of the Buffalo & Susquehanna Iron Co., has taken place. The plant is now connected with deep water.

The Detroit & Buffalo Steamboat Co. opened its season of navigation between Detroit and Buffalo with the sailing of the steamer Eastern States from Detroit on Thursday of this week.

The steamer Brazil which was recently purchased by Sheboygan parties, will be used exclusively between Buffalo and Green Bay this season. She is now owned by the Wisconsin Transportation Co.

The new dominion fisheries cruiser built for the protection of the Canadian fishing grounds in Lake Erie has gone into commission. She is much faster than any fishing tug on the lakes and is well armed.

The new steamer George H. Russel will be launched from the St. Clair yard of the Great Lakes Engineering Works on Saturday next. The Hoover & Mason will be launched at the Ecorse yard on April 29.

The battleship Maryland built by the Newport News Ship

Building & Dry Dock Co., Newport News, Va., was formally turned over to the government during the week. She will be commanded by Capt. Roy R. Ingersol.

When the steamer James C. Wallace was placed in dry dock at Lorain it was found that her injuries received at the launch were more serious than had been supposed. Eight plates were dented and had to be re-rolled.

It is understood that the new breakwater at Waukegan, 600 ft. long, which was built last year to prevent the harbor entrance from northeast gales, has failed to do its work satisfactorily and will have to be lengthened.

Capt. C. B. Hart and his son Eugene, until recently of the Hart Steamboat Co., have purchased the steamer Sailor Boy from the Arnold Transportation Co. and will engage in the freight and excursion business out of Sturgeon Bay.

The Marine Firemen, Oilers and Watertenders' union has signed contract for the season with the Lumber Carriers' association upon the same basis as contracts were recently made with the Lake Carriers' association, that is \$45 per month to Oct. 1 and \$65 per month thereafter.

Beginning in May the Merchants Line will furnish a fortnightly service between Montreal and Fort William. Two steamers will be put on the route and calls will be made at Toronto, Hamilton, Toledo, Cleveland and other way ports. The company has added the steamer City of Montreal, formerly the China, to its fleet.

WORK UPON ERIE CANAL

Actual work upon the enlargement of the Erie Canal will begin within a month. At the present time five contracts have been let covering an expenditure of \$3,235,000. These contracts are as follows: No. 1, Champlain Canal from Lake Champlain to the Hudson river, Albany, \$605,000; No. 2, near Waterford on the Erie, \$852,000; No. 3 Champlain Canal, \$670,000; No. 4, near the east end of Oneida Lake, \$726,000; No. 5, near Mosquito Point Bridge over the Seneca river near the village of Savannah, \$382,000. Contracts Nos. 1, 4 and 5 were awarded to Lindon W. Bates, New York; contract No. 2 to the Ferguson Contracting Co., New York, and contract No. 3 to Sundstrom & Stratton of New York.

OBITUARY

Mr. L. W. Perry, one of the pioneer business men of northern Ohio, died at Cleveland last week. Mr. Perry was interested in great lakes traffic as a shipper, being a most extensive dealer in lumber. He was one of the greatest lumber merchants doing business in the great lakes region. Mr. Perry was born in Trumbull County, Ohio, in 1828, and went to Cleveland in 1852.

Capt. Phineas Clark, seventy-eight years old, died at Detroit last week. He was born at London, Ont., Sept. 1, 1827, and took to the lakes when ten years old. At the age of twenty he became master of the steamer Pacific, running between Chicago and Milwaukee. He retired about twenty-two years ago.

Miss Harriet E. Colfax, who had been for forty-three years the keeper of the Michigan City light-house on Lake Michigan, died last week at the age of eighty-one years. Until her retirement last fall Miss Colfax was the oldest light-house keeper in the United States service.

WORK ON DAM AT THOMSON

Duluth, April 18.—The Great Northern Power Co. of Duluth, Minn. has bought several thousand carloads of material for its lower dam, at Thomson. These include 40,000 bbls. of Universal Portland cement, and 2,000 cu. yds. of Lake Superior gravel, the former from the Illinois Steel Co., the latter from the Whitney Bros. of Duluth. Work on

the canal and forebay has been let, and is to be done during the coming twelve months. It is chiefly channelling, with only about 20,000 yards of earth excavation. The company is building a railway line from the Northern Pacific road to its work, and will be employing a large number of men in a few weeks. Concrete work on the big reservoir dam begins at once.

SHIPPING FACTS

The Oliver Ames is the largest two-masted schooner afloat. The Bradford C. French is the largest three-masted schooner afloat.

The Marie Palmer is the largest four-masted schooner afloat.

The Jane Palmer is the largest five-masted schooner afloat.

The William L. Douglass is the largest six-masted schooner afloat.

The Thomas W. Lawson is the only seven-masted schooner in the world.

The Addie M. Lawrence is the smallest six-masted schooner afloat.

The James Pierce is the smallest five-masted schooner on the Atlantic coast, but eight smaller ones are on the Pacific coast.

The Dorothy Belle is the smallest four-masted schooner on the Atlantic coast but five smaller ones are on the Pacific coast.

The largest American brigantine is the Motley of Harrington, Me.; the smallest the Pitcairn of San Francisco.

The largest American barkentine is the Fullerton of Los Angeles; the smallest the Fremont of San Francisco.

The largest American bark is the Homeward Bound of San Francisco; the smallest the A. R. Tucker of New Bedford.

The largest American ship is the Roanoke of Bath; the smallest the Centennial of San Francisco.

The French Line steamship La Savoie, which arrived in New York this week, is equipped with a new life raft, the invention of Harry Matson, the vessel's chief steward. The raft has already been tried and found successful. It is 12 ft. long, 9 ft. wide and 3 ft. deep, and is capable of carrying fifty persons, is watertight and has compartments for food and fresh water. The advantage claimed for it by the inventor is that within a fraction of a minute all the life rafts on the ship can be put overboard. They rest on a platform supported by pillars and held in place by pins. By turning a lever these pins are removed and the platform tilted so that the raft slides into the sea.

Bids will be opened at the bureau of ordnance of the war department Washington on April 22 for one set of steel forgings for the 12-in. B. L. mortar, model 1886-1890 model. Also for one set of steel forgings for a 6-in. R. F. gun, model of 1900. On the same date bids will be opened for 630,000 lbs. of smokeless powder for field and sea-coast guns. On May 4 bids will be opened for 100,000 lbs. of saluting powder for field, siege and sea-coast guns.

The Stirling Co. will remove the executive and accounting departments of the company from Chicago to the Trinity building, New York, on May 1. It will continue, however, to maintain its present offices in the Pullman building, Chicago, for the convenience of its friends and trade in the west.

The ice breaker Montcalm was reported a few days ago in the ice in the St. Lawrence river and will probably be imprisoned until the ice starts to move towards the sea. It is represented as being piled 35 ft. above her.

TRADE NOTES

That the steam turbine and tube-generator are destined to be one of the greatest power developing and distributing factors is evidenced by the number of units of this type which have been installed, and which are now in the process of construction. Owing to the restrictions placed by reciprocating engine speeds upon the designs of engine type generating machinery, their dimensions and bulk, as also the cost, have increased enormously in the past few years with the increase in capacity. With the advent of the steam turbine the speeds have increased so as to secure in generator construction minimum bulk and cost consistent with strength and durability. A striking example of this may be seen in the power equipment of the Rapid Transit Co. in New York. Turbine type generators with a rated output of 5,000 kw., weighing 234,000 lbs., run at 750 r. p. m. Generators of the same output driven by reciprocating engines at a speed of 75 r. p. m., weight 680,000 lbs. Orders for eight turbine generators have been placed with the Westinghouse Electric & Manufacturing company in the past few days, most for 400 and 500 kw. units, with one 2,000 kw. and one 2,500 kw. machine.

The Michigan Motor Co., Grand Rapids, Mich., has just put out a little catalogue devoted to speed wheels. The wheels are made of gun metal bronze and the company claims that they are the best speed wheels in the market for racing motor boats, cruisers, yachts, launches and auxiliary sailing craft. The company keeps a large stock on hand and can make shipments promptly. With the company's reversible wheels the operator has perfect control over his boat, which can be run at any speed desirable, either ahead or astern and can be stopped within its length while running at full speed. The reversible two-blade propeller wheels are designed and built on the lines of a perfect solid wheel with true screw pitch having the same form and appearance as the solid wheel with the forward pitch with the advantage of reversing. The catalogue gives a complete list of prices and can be had upon application.

The Joseph Dixon Crucible Co., Jersey City, N. J., are sending this month to a large number of concerns interested in marine engineering a group of circulars. The circulars are single sheets printed only on one side and are very tastily gotten up. They bespeak the merit of Dixon flake graphite for pipe fitting. Dixon flake graphite is a widely valued lubricant for pipe threads, making tight and close connections an easy matter to obtain, and allowing them to be unscrewed perfectly easy after any length of time. Flake graphite smooths the surfaces, prevents actual contact of bearing metals under all conditions, reduces the natural tendency of bearings to warm up and allows the use of lighter-bodied greases. Each circular may be conveniently acquired and is quite argumentative. They are well worth writing for.

Crane Co., have just issued their advance circular describing crane, steam and oil separators for the separation of water from live steam, and the elimination of oil from exhaust steam. It is made in sizes from 1 to 30 in., in the following types: Horizontal, vertical, angle, and distributing. This circular contains twenty-six 10½ by 13½ sheets, printed on white enameled paper, and handsomely illustrated from half tone engravings. It will be sent to the trade upon request. Please ask for "Advance Circular No. 01."

"The Launch" is the title of a little quarterly published by the Truscott Boat Mfg. Co., St. Joseph, Mich. It is a well illustrated little magazine and includes articles from all parts of the globe. The Launch is now conducting a photographic contest in which everyone who has a chance to snap a Truscott product should be interested as the prizes are really good ones.

The Armstrong Cork Co. of Pittsburg announces that it has received rush orders for 100,000 new life preservers.

Since the Slocum disaster the steamboat inspectors have pretty generally condemned the life preserving equipment on excursion steamers and this has meant much business for the makers of life preserving equipment.

The Gas Engine Whistle Co., 113 Broadway, New York, are issuing typewritten circulars concerning the Watres power whistle. It works direct from the engine and blows a strong deep blast like a steam whistle, carrying for miles.

ITEMS OF GENERAL INTEREST

The port engines have been installed in the battleship Rhode Island, now under construction at the yard of the Fore River Ship Building Co., Quincy, Mass.

The Empire Engineering Co. has been incorporated at Albany with a capital of \$1,000,000. Mr. Lindon W. Bates has been chosen president and Edward D. Adams is the principal stockholder.

The Norfolk Viaduct Corporation has been formed to build an aerial bridge between Norfolk and Berkley. The Elizabeth river, which it is the purpose to span with this bridge, is 642 ft. wide at the point where the bridge will be constructed. Mr. J. A. Turner, of Minneapolis, who designed the aerial bridge at Duluth, and Mr. J. A. McGilvary, will supervise its construction. Plans for the bridge have already been submitted to the harbor board of Norfolk. The Norfolk Viaduct Corporation was organized to construct this bridge from having seen an account in a magazine of the Duluth structure. The idea, however, is not original with Duluth, a similar bridge having been in successful operation at Rouen, France, for a number of years.

At the annual meeting of the shareholders of the Cunard Steamship Co., held in Liverpool last week, Lord Iverclyde, the chairman, announced that the shipping combine, which is the common name for the steamship lines consolidated by Mr. J. Pierpont Morgan, had intimated its inability to carry out one of the most important clauses of the settlement recently arrived at, and consequently all tentative arrangements between the Cunard line and the continental lines in the combine were inoperative. He announced that he believed the shipping combine was aimed directly against the Cunard line. He thought the shareholders would not regret the sacrifices necessary to maintain the independence of the Cunard line against the alliance formed in opposition to it. The company has passed its usual dividend.

The beautiful summer resort at Deer Park, Md., which is better known internationally than any resort of the Allegheny mountain range south of the Adirondacks, has been improved and made more attractive than ever. The tennis courts and golf links are now immediately in front of the large hotel and are, therefore, very convenient for use. For fifteen years this magnificent resort has attracted most fashionable assemblages, not only from the East, but from everywhere, and, consequently, has added to and extended its already spacious grounds. Large sums of money have been spent in enhancing the natural attractiveness and beauty of the grounds, located at such an elevation as to give perfectly pure and exhilarating atmosphere. Five hundred acres is a large area to be covered by a hotel and its environments, but the nine-mile plateau in this particular section of the Allegheny range affords an excellent opportunity to spread out. There are twelve cottages belonging to the hotel, each having several acres of ground immediately surrounding it. Ex-President Cleveland occupied one of them for a season while he was chief executive of the country. The cottage season will open on June 15, while the hotel will be opened June 24, under the management of Mr. W. E. Burwell, the most efficient superintendent of hotels of the Baltimore & Ohio railroad.

APR 24



VOL. XXXI.

CLEVELAND, O., APRIL 20, 1905.

NEW YORK
PUBLIC LIBRARY
No. 16.
ASTOR, LENOX AND
TILDEN FOUNDATIONS.

Columbia Insurance Co.

of Jersey City, N. J.

Atlantic Marine Department

Fireman's Fund Insurance Co.

of San Francisco, Cal.

U. S. Branch

Mannheim Insurance Co.

of Mannheim, Germany

U. S. Branch

The Union Marine Insurance Co., Ltd.

of Liverpool, England.

MARINE INSURANCE

On Hulls, Cargoes and Freights

Inland Transportation, Travelers and Salesmen's Floaters,
Automobile Insurance.

F. HERRMANN, Manager,

79-85 Wall St.,
New York

ORR & WALL, General Agents,

2 and 4 Sherman St.,
Chicago

AGENCIES AT ALL THE PRINCIPAL OCEAN AND LAKE PORTS.

SHIP MACHINERY, embodying the latest designs and many important patented improvements.

Sole builders of the Original and Only **AUTOMATIC STEAM TOWING MACHINE.**

Established
1857

AMERICAN SHIP WINDLASS CO.

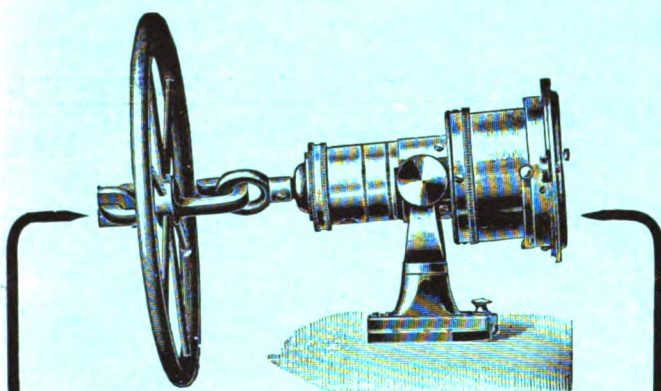
Providence, R. I.

We have completed our new Iron Foundry, and are prepared to execute orders for Castings, guaranteeing first-class work, prompt service and reasonable prices.

Send for illustrated catalogue

P. O. Box 53

Address FRANK S. MANTON, President



THE "NEPTUNE" LOG

The "Neptune" Ship Log has ball bearings for high speeds. We also make the "CHERUB" and "HARPOON" Ship Logs.

MAKERS TO THE BRITISH NAVY

THOMAS WALKER & SON

BIRMINGHAM, ENGLAND.

The Brown Hoisting Machinery Company, Incorporated.

Engineers, Designers and Manufacturers of Special Machinery for hoisting, conveying, storing and handling material of all kinds under the well known "BROWNHOIST" Patents.

Bridge Unloaders
for rapidly discharging bulk cargoes from vessels directly to cars to storage on docks.

Fast Plant Unloaders
for rapidly handling either bulk or package freight.

Cranes
of every description for every kind of service.

26 Cortlandt St.
NEW YORK CITY

MAIN OFFICE AND WORKS
CLEVELAND, O., U. S. A.

Carnegie Building
PITTSBURG, PA.

European Office, 39 Victoria St., LONDON, S. W.

New Metal Cargo Hoisters



Wrought Iron Hook and Strap, Galvanized Iron Shells and Sheaves. Sheaves fitted with Genuine Star Metaline Bushings with Metaline Side Bearings.

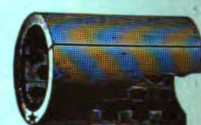
These Blocks Save the Rope and Outwear all others.

Send for No. 15 Catalogue M. A. R. FREE

Manufactured only by

BOSTON & LOCKPORT BLOCK CO.

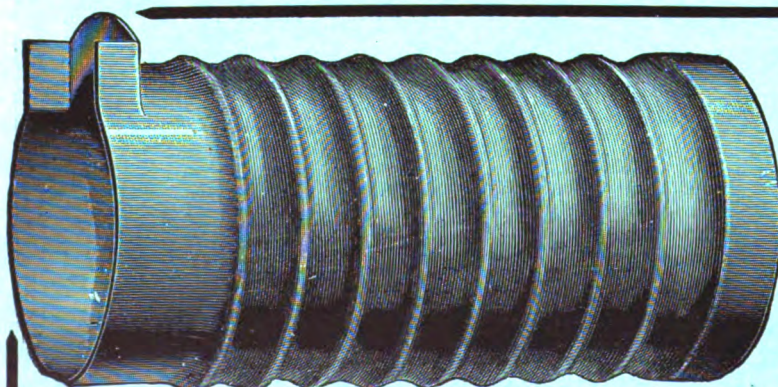
BOSTON, MASS.



Star Metaline Bushing

SELF-OILING

LOCKPORT, N. Y.



Manufactured by

THE CONTINENTAL IRON WORKS,

West and Cayler Sts., NEW YORK.

Near 10th and 23d Sts. Ferries
Borough of Brooklyn.

Morison Suspension Boiler Furnaces

For Land and Marine Boilers

Uniform Thickness—Easily Cleaned
UNEXCELLED FOR STRENGTH

Also Fox Corrugated Furnaces

MARINE IRON WORKS,
INCORPORATED
BUILDERS OF
MARINE ENGINES
AND BOILERS
COMPLETE OUTFITS OF
MARINE MACHINERY
A SPECIALTY.
STATION A. CHICAGO, ILL.

CATALOGUE FREE ON REQUEST.

U.S.
Automatic Injector

There is one BEST in Injectors and that is the U. S. Automatic Injector.

Its reputation for reliability and durability is endorsed by 200,000 engineers and by the U. S. Government. It is the thoroughly practical injector and has exclusive advantages which commend it to every engineer. The Drip Cock, which if left open prevents any possibility of freezing, is only one of the advantages which make it superior to every other injector.

We want to tell you more about the U. S. Automatic Injector. Send your name and address and get full information and a copy of our valuable "Engineer's Red Book" which will be sent absolutely free. Write today.

AMERICAN INJECTOR CO.,
Detroit, Mich., U.S.A.

PENBERTHY

THE DAWN OF A NEW DAY FOR THE ENGINEER

If you have Injector troubles, the quickest and cheapest way to rid yourself of them is to install a

PENBERTHY
AUTOMATIC INJECTOR

It will be a revelation to you. No breaks, no bother of any sort, but a steady flow of water to your boiler whenever you want it.

THE PENBERTHY FORCE-FEED OIL PUMP

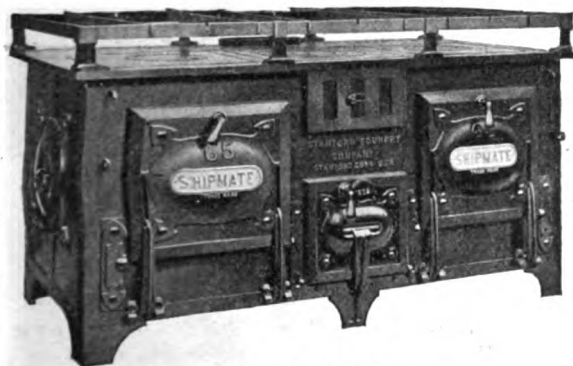
feeds any oil at any rate desired, regardless of speed of engine, or temperature of engine-room. Engineers who have a "Penberthy" are satisfied.

The Penberthy Catalog is the best guide by which to buy engine-room specialties. Write for a copy today.

The Penberthy Bulletin sent to you free for three months. Send us your name now.

The Penberthy Injector Company
Largest Manufacturers of Injectors in the World
351 Holden Ave., DETROIT, MICH., U. S. A.
Manufactured in Canada by Penberthy Injector Co., Ltd., Windsor, Ont.

SHIPMATE RANGES



ESTABLISHED 1830.

Not all vessels require a range as large as our No. 65, which is 5 feet long, so we make seven other sizes down to No. 1 with 20 inch top. Send for our Shipmate catalogue giving full dimensions of different sizes.

They are sold on the Lakes by

Bean, Schermerhorn & Co., 69 Main St., Buffalo,
R. T. Mitchell, 64 Prospect St., Cleveland,
The T. B. Rayl Co., 112-116 Woodward Ave., Detroit,
J. B. Sperry, Port Huron,
Geo. B. Carpenter & Co., 202-208 So. Water St., Chicago,
Lott, Burton & Co., 86 Lake St., Chicago,
John Black, 81-170 92nd St., South Chicago.

MADE BY
THE STAMFORD FOUNDRY COMPANY, STAMFORD, CONN.



The American Ship Building Company

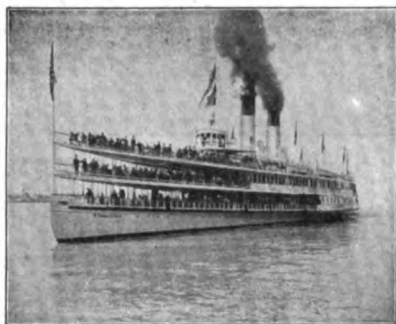
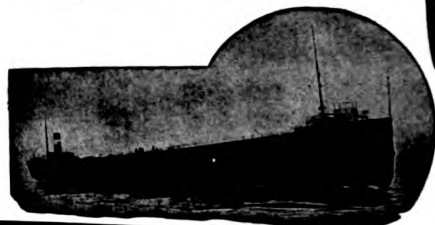
MAIN OFFICE CLEVELAND, OHIO

SHIP YARDS, DRY DOCKS AND REPAIR SHOPS AT

Cleveland
Lorain
Buffalo

Detroit
Bay City
Wyandotte

Chicago
Superior
Milwaukee



Detroit Ship Building Company

SHIP AND ENGINE BUILDERS

Sole Owners for the Lakes and Atlantic Coast of the HOWDEN HOT DRAFT SYSTEM as applied to Boilers, giving increased power and great economy.

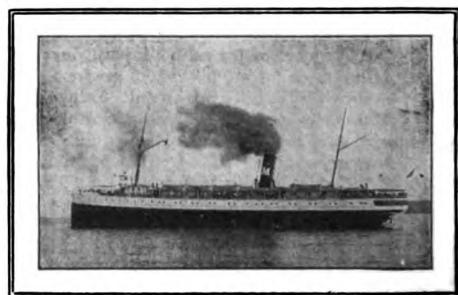
Steel Ship Yard located at Wyandotte, Michigan
Wooden Ship Yards and Dry Docks, Foot of Orleans Street, and Foot of Clark Ave., Detroit, Mich.

Alexander McVittie, President and Manager
William C. McMillan, Vice President
M. E. Farr, Secretary and Treasurer
Charles B. Calder, General Superintendent
Frank E. Kirby, Consulting Engineer

WM. L. BROWN, Pres.
C. WALLACE, Vice-Pres.

O. R. SINCLAIR, Sec'y and Treas.
ALFRED G. SMITH, Gen'l Supt.

Chicago Ship Building Company



STEEL SHIPS

Passenger or Freight

ANY SIZE

Yards, Dry Docks and Repair Shops at South Chicago, Ill.



The Superior Ship Building Company

SHIP AND ENGINE BUILDERS

Dry Docks and Repairs of all kinds

Large stock of material always on hand for Repairing Wooden and Metal Ships.

Repairing promptly attended to, Night or Day.

WEST SUPERIOR

WISCONSIN

EDWARD SMITH, President.

WILLIAM KNIGHT, Ass't Sec'y and Treas.

ADAM STEEL, Superintenden

THE BUFFALO DRY DOCK COMPANY,

GANSON STREET AND BUFFALO RIVER.

Operating Four Docks, Sixty-Ton Shear Legs, and in every way Equipped with Modern Plant for the Building and Economical Repairs of

STEEL AND WOODEN SHIPS.

LONG DISTANCE TELEPHONE CONNECTIONS:

Office Telephone, 515 Seneca.
President's Telephone, 209 Bryant, Residence.

President's Telephone, 3920 Seneca, Office.
Asst. Sec'y & Treas., Tel hone, 609 Bryant, Residence.

MILWAUKEE DRY DOCK COMPANY,

MILWAUKEE, WISCONSIN.

Ship Repairs of all kinds.

Two Ship Yards offer every Facility for the Repair of both Steel and Wooden Vessels.

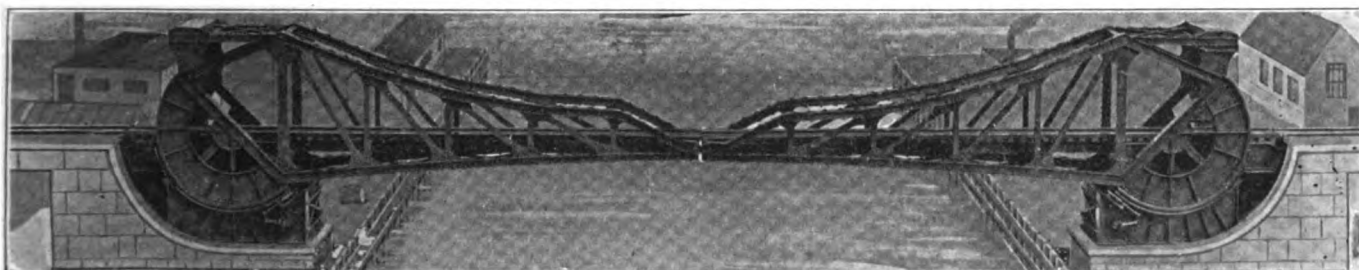
South Yard Dock is 450 ft. long on keel blocks; 460 feet over all; 60 feet width of gate, and 16 feet over sill.

West Yard Dock 312 feet on keel blocks; 45 feet width of gate, and 12 feet over sill.

RUDDER PIT IN EACH DOCK.

ELECTRIC LIGHTS FOR NIGHT WORK.

Main Office at SOUTH YARD, Foot of Washington Street.

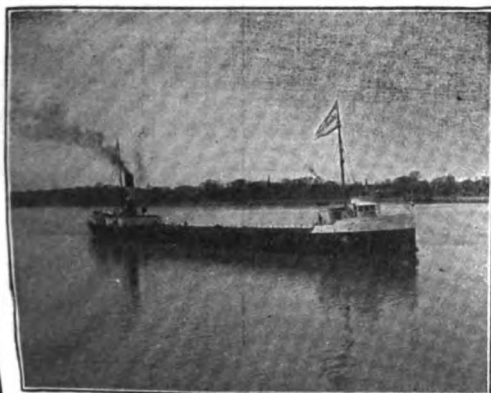


THE COWING LIFT BRIDGE

Write for Plans and
Estimates

(HIGHEST AWARD AT ST. LOUIS, MO.)

JOHN P. COWING
Contracting Engineer
426 Citizens Bldg., Cleveland, O.



CRAIG SHIP BUILDING CO.

TOLEDO, OHIO.

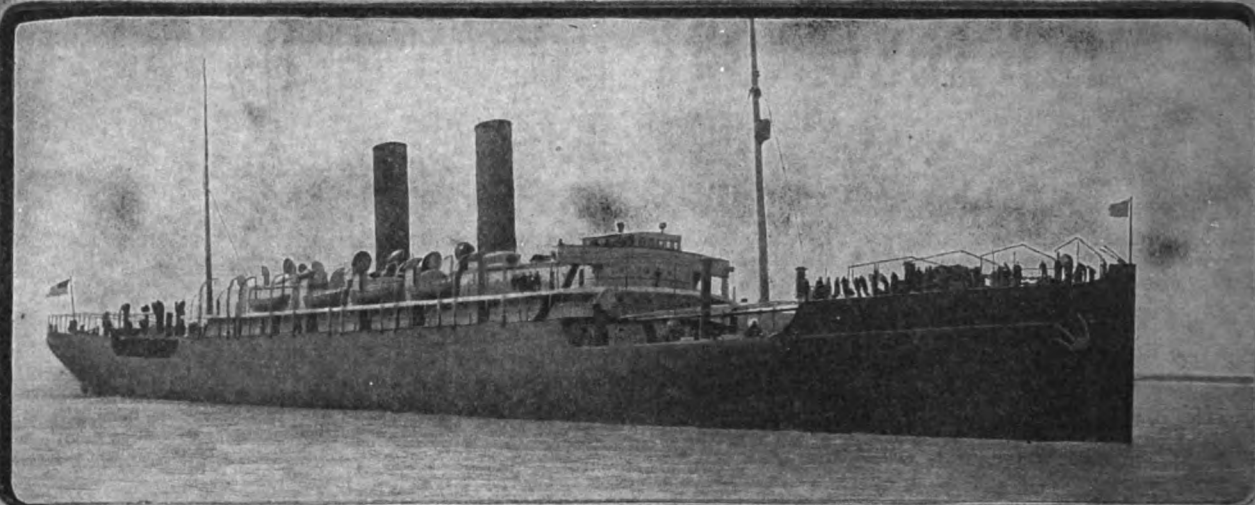
METAL - AND - WOODEN - SHIP - BUILDERS.

New Dry Dock—525 feet long, 110 feet wide on top,
55 feet wide on bottom, 16 feet of Water on Sill.

Repairs to Metal and Wooden Ships
A SPECIALTY.

OUR SHIPYARD

WITH ITS ACCOMPANYING DRY DOCKS
AND WORKS, WAS CAREFULLY DESIGNED,
EQUIPPED AND COMPLETED FOR THE



CONSTRUCTION AND REPAIRING
IN EVERY DETAIL OF

BATTLE SHIPS · ARMORED CRUISERS ·
PROTECTED CRUISERS · GUN BOATS ·
TORPEDO BOATS · TORPEDO BOAT
DESTROYERS · SUBMARINE BOATS ·
OCEAN LINERS · PASSENGER STEAM
ERS · FREIGHT CARRIERS · Etc · Etc ·

NEWPORT NEWS SHIPBUILDING & DRY DOCK CO.
1 BROADWAY NEW YORK — NEWPORT NEWS, VA.

After four years of investigation, the Boiler Committee appointed by the British Admiralty have unanimously declared that water tube boilers are more suitable for Naval purposes than cylindrical, and have again placed THE BABCOCK & WILCOX at the head of all types.

THE BABCOCK & WILCOX CO.

NEW YORK and LONDON

Bayonne, N. J., U. S. A.
Renfrew, Scotland.

WORKS:

Paris, France.
Oberhausen, Germany.

The Only Chain

"as good as"

*a Woodhouse Chain is
Another Woodhouse
Chain.*

Seems strange, perhaps, that one firm should excel in making Marine Chains and other chains when the same materials which we use are used by others.

But knowing how has lots to do with it.

And "knowing how" includes more than the mere practical knowledge of chain-making, for it also includes a knowledge of what is required of certain chains—Crane and Dredger Chains, for instance—and how to meet the requirements.

Try us once and see why folks who know swear by the Woodhouse Brand.

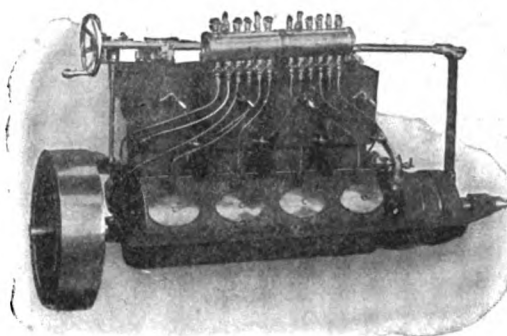
Write us about it anyway.

Woodhouse Chain W'ks,

TRENTON, N. J.

TRUSCOTT

THE DEPENDABLE MARINE MOTOR



Made to withstand the most severe and continuous service. A practical design characterized by the accessibility, compactness and simple ignition, gas producing and oiling features. Perfect control.

Four cycle type two and four cylinders, from 8 to 65 H. P. Smaller sizes of the two cycle type.

Catalogue and copy of The Launch for the asking.

Department 46.

Truscott Boat Mfg. Co.

ST. JOSEPH, MICHIGAN.

PINTSCH GAS LIGHTED BUOYS

Adopted by the English, German, French, Russian and United States Light House Departments for Channel and Harbor Lighting; over 1800 gas buoys and gas beacons in service. : : :

BURN CONTINUOUSLY FROM 80 TO 365 DAYS AND NIGHTS WITHOUT ATTENTION AND CAN BE SEEN AT A DISTANCE OF SIX MILES. : : : :

Brilliant and Steady Illumination.

Economical and Reliable in Operation

Controlled by the

SAFETY CAR HEATING AND LIGHTING COMPANY,

160 BROADWAY,

NEW YORK CITY.

CLYDE LINE APACHE

U.S. BATTLESHIP MAINE

THE
WM.
CRAMP
— & SONS —
SHIP & ENGINE BUILDING Co.
ESTABLISHED 1830

I. P. MORRIS COMPANY
(ESTABLISHED 1829)

KENSINGTON SHIPYARD Co

WARSHIPS AND MERCHANT STEAMERS
Pumping, Blowing and Hoisting Engines, Dry Docks
Vertical and Horizontal Turbines
Centrifugal Pumping Machinery
Marine Railway.
Repairs to all classes
of vessels

LARGE TURBINE

VIEW OF ONE OF OUR DRY DOCKS

Philadelphia

THE NICLAUSSE BOILER.

The largest merchantmen in the world, the S. S. Minnesota and Dakota, of 33,000 tons and 11,000 H. P. each, are equipped with Niclausse Boilers.

641,000 HORSE POWER IN THE NAVIES OF ELEVEN NATIONS.

THE NEW JAPANESE CRUISERS, KATORI AND KASHIMA, OF 16,000 H. P. EACH, AND IN THE UNITED STATES NAVY THE ARMORED CRUISERS PENNSYLVANIA AND COLORADO, 23,000 H. P. EACH, AND THE BATTLESHIPS GEORGIA AND VIRGINIA, 19,000 H. P. EACH, WILL BE FITTED WITH THESE BOILERS.

THE ONLY WATER-TUBE BOILER SUCCESSFULLY USED AND PROVED IN LARGE SHIPS.

Requires no space at sides or rear—cleaned from the front.

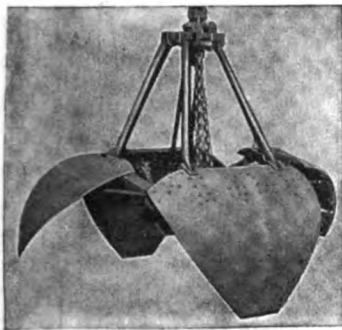
Employs no tube-caps—tubes can readily be withdrawn without mutilation.

FORGED STEEL THROUGHOUT.

THE STIRLING COMPANY

Chicago.

KIESLER AUTOMATIC BUCKETS



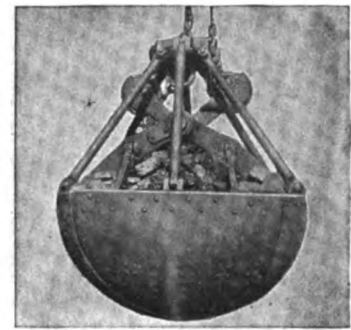
Orange Peel
Open

Orange Peel and Clam Shell Types
for handling Coal, Iron Ore and Excavating

We guarantee our Orange Peel to always fill in large lump Soft Coal and Iron Ore. Has two flat lips and will not damage boats or cars. Are from 30 to 50% lighter than any other buckets. Digging ability due to powerful system of leverage.

Write for Catalogue and Prices

MAYO & BAILEY 1548 1st Nat'l Bank Bldg.
CHICAGO



Orange Peel Closed
showing load

THE STANLEY B. SMITH COAL AND DOCK CO., TOLEDO HARBOR, TOLEDO, OHIO.

1,800 Feet of Dock.

6 McMyler Derricks.

Capacity 8,000 Tons Daily.

Fuel Lighters. —"KANAWHA."
—"PENNSYLVANIA."
—"HOCKING."

Docks. —PENNSYLVANIA R. R.
—HOCKING VALLEY R. R.
—TOLEDO AND OHIO CENTRAL R. R.

SMITH'S COAL DOCK, Detroit River, DETROIT, MICH.

12 Pockets.

Platform.

Low Dock.

Operated by STANLEY B. SMITH & CO.

MARINE SUPPLY COMPANY—STORE AND ICE HOUSE ON DOCK.

PITTSBURG COAL COMPANY

GENERAL OFFICE, LAKE DEPARTMENT, PERRY-PAYNE BUILDING, CLEVELAND, OHIO

Steamboat Fueling Facilities at Various Points on the Great Lakes

CLEVELAND HARBOR { 4 Car Dumpers.
3 Lighters.

FAIRPORT HARBOR { 1 Car Dumper.
1 Lighter.

ERIE HARBOR { 1 Car Dumper.
Fuel Pockets.

ASHTABULA HARBOR { 1 Car Dumper.
1 Lighter.

DETROIT RIVER BRANCH { Docks and Pockets at
Sandwich and Amherstburg.

SAULT RIVER BRANCHES { Dock and Pockets at Detour.
Dock and Pockets at Sault Ste. Marie. (The Port Royal Dock Co.)

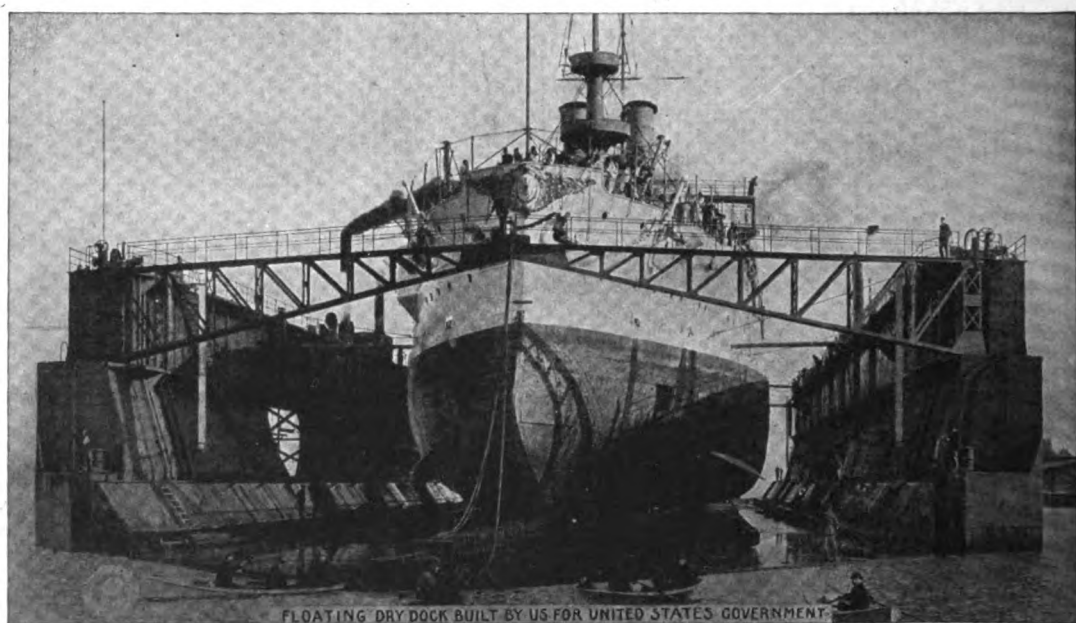
WE FURNISH ONLY THE BEST GRADE OF

PITTSBURG AND YOUGHIOGHENY COAL

MARYLAND STEEL COMPANY

BUILDERS OF STEEL STEAMSHIPS,
TOW BOATS, SAILING VESSELS,
BARGES AND STEAM CRAFT
OF EVERY DESCRIPTION

STEEL FLOATING DRY DOCKS
CAPABLE OF DOCKING
THE LARGEST VESSELS



FLOATING DRY DOCK BUILT BY US FOR UNITED STATES GOVERNMENT.

SPARROW'S POINT,
MARYLAND.

CLEAN BOILERS

Dearborn Water Treatment made to suit the case. Takes off the scale, keeps it off, stops corrosion and foaming. Send gallon of water for analysis.

DEARBORN DRUG & CHEMICAL WORKS

G. R. CARR,
Mgr. Marine Dept.

16 BRANCH OFFICES IN THE U. S.

227-234 Postal Telegraph Bldg., CHICAGO.

THE ROBERTS
SAFETY WATER-TUBE
BOILER CO.

Manufacturers of
High Grade

**Marine
Water Tube
Boilers**

Generators of the Highest Quality of Steam
NEARLY 1500 IN USE

Send for circulars
and stock sheet

MAIN OFFICE

39 Cortlandt St. New York City

Phone 509 Cortlandt

Works: Red Bank, N. J.
Phone, 49 Red Bank

Cable Address
"Bruniva"

Lunkenheimer
"Sentinel"
Oil Cups.



Workmanship and material unexcelled.

Fitted with sight-feed and easy to fill.

Feed regulation not affected by jarring machinery.

Needle valve can be opened or closed without destroying feed regulation.

Notify us if your local dealer cannot furnish them.

**THE LUNKENHEIMER
COMPANY**

CINCINNATI, OHIO, U. S. A.

BRANCHES:

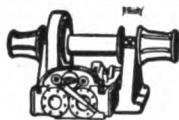
26 Cortlandt St., New York.
35 Great Dover St., London.

102



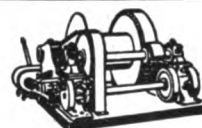
GASOLENE MARINE ENGINES

Suitable for all Boats from 3½ to 200 HP.
Over 100 in successful use.
Also the well known and always reliable Woolters Gas or Gasolene Stationary Engines.



HOISTING ENGINES

Of all kinds and sizes, and for all purposes, especially for ship use.
Docking and Hauling Engines and Wire Rope Windlasses.



AUTOMATIC TOWING MACHINES

Somewhat the cheapest, and altogether the best. Positively guaranteed.
Automatic Fog Whistle Machines
Steam Steering Engines.

FOR THESE AND OTHER WELL KNOWN SPECIALTIES ADDRESS ALL INQUIRIES TO.

THE CHASE MACHINE CO. Engineers and Machinists, CLEVELAND, OHIO.

New York Shipbuilding Company

Main office and works, Camden, N. J., New York office No. 1 Broadway

Builders of
SHIPS — ENGINES — BOILERS
HEAVY MACHINERY



Launch of "Mongolia," Pacific Mail S. S. Co., July 25, 1903.
615 feet long, 65 feet beam, 51 feet deep.

Best Facilities for Repair Work

**Pneumatic and Electric Tools;
ample wharfage accomodation.**

100 ton crane.

Repairs done under shelter.

Engineers' Number

The Marine Review of May 4 will be devoted to topics that interest the men below deck, or aft as they would say on the great lakes.

The modern vessel is becoming more and more an engineer's problem. Hundreds of devices are finding their way aboard ship. Mechanical ingenuity is supplanting hand labor in various ways. On some ships the auxiliary equipment is practically all electrical. Changed conditions have brought their little problems with them.

Marine engineers are invited to relate their experiences, to tell of things that happen in the day's work. The Marine Review will pay them for the articles.

Look for the Marine Review of May 4.

TO USERS OF LIFE PRESERVERS

We desire to call attention to our new

Acme Cork Life Preservers

which we unhesitatingly recommend as the most efficient, durable and economical preservers manufactured.

The blocks are made of compressed cork and contain no admixture of any foreign substance whatever.

The canvas, straps, thread and workmanship are of the highest possible standard and are in strict accordance with the government regulations.

The actual tests of these preservers made in Washington before the Board of Supervisors, were the most severe ever made and demonstrated beyond dispute their great superiority.

After submersion in water for ten days their buoyancy was over 30 % greater than that required by law.

We will be pleased to quote prices and terms upon application.

Armstrong Cork Company

Boston New York Philadelphia Baltimore
Pittsburgh Chicago St. Louis

NINETEENTH ENLARGED EDITION; OVER 1,400 PAGES.

THE SHIPPING YEAR BOOK WORLD 1905

EDITED BY MAJOR JONES AND A STAFF OF EXPERTS.

The Work Embraces { I.—Customs Tariffs of All Nations.
II.—A Port Directory of the World.
III.—Board of Trade Rules and Regulations.
IV.—Load Line Tables, Sailing Rules, Lights, Signals.
V.—Digest of Shipping Laws. Much other Useful Information.

A LARGE MAP OF THE WORLD, especially designed by J. G. Bartholomew, F. R. G. S., F. R. S. E., is supplied in a pocket in the cover. Introduced by a RETROSPECTIVE VIEW of 1904.

Crown 8vo., cloth. Price, post free: In the United Kingdom, 5s; foreign countries, 6s, except in the United States where the Sole Agents for 1905 are

THE DERRY-COLLARD CO., 256-7 Broadway, NEW YORK.

THE TIMES.—"The information given is wide in scope, and varied in matter, dealing with almost every subject of interest connected with trade, commerce, and navigation. About one-third of the volume is devoted to the tariffs of all nations, which are given in full.

DAILY TELEGRAPH.—"A more comprehensive handbook in its special line for the merchant's desk there could scarcely be."

NEW YORK TRIBUNE.—"This compact book of upwards of twelve hundred pages, published by 'The Shipping World,' of London, contains an immense amount of information of value to the mariner and shipper.

PALL MALL GAZETTE.—"The 'Shipping World Year Book' would be very much missed if it failed to put in a regular appearance, but fortunately there is no danger of that. The comprehensive retrospect of shipping affairs deserves special attention, and will repay careful study.

GLASGOW HERALD.—"The book more than ever commands the confidence of those large mercantile classes who have been accustomed to consult its pages for world-wide information, and always with success."

NEWCASTLE CHRONICLE.—"Those who refer to it will find all matters appertaining to the business of the shipowner brought right up to date."

LIVERPOOL JOURNAL OF COMMERCE.—"Filled from cover to cover with information absolutely indispensable to all engaged in the over-sea commerce of this country."

TIMBER.—"There is not another book of its size in the world which contains so much information worth having."

SOUTH WALES DAILY NEWS.—"Major Jones, the capable editor, has anticipated the public attention now being devoted to tariffs, and those of all nations and of the Colonies have been included and revised up to the last hour of publication."

1828

THE SHIPPING WORLD OFFICES, Effingham House, Arundel-street, Strand, London, W. C.

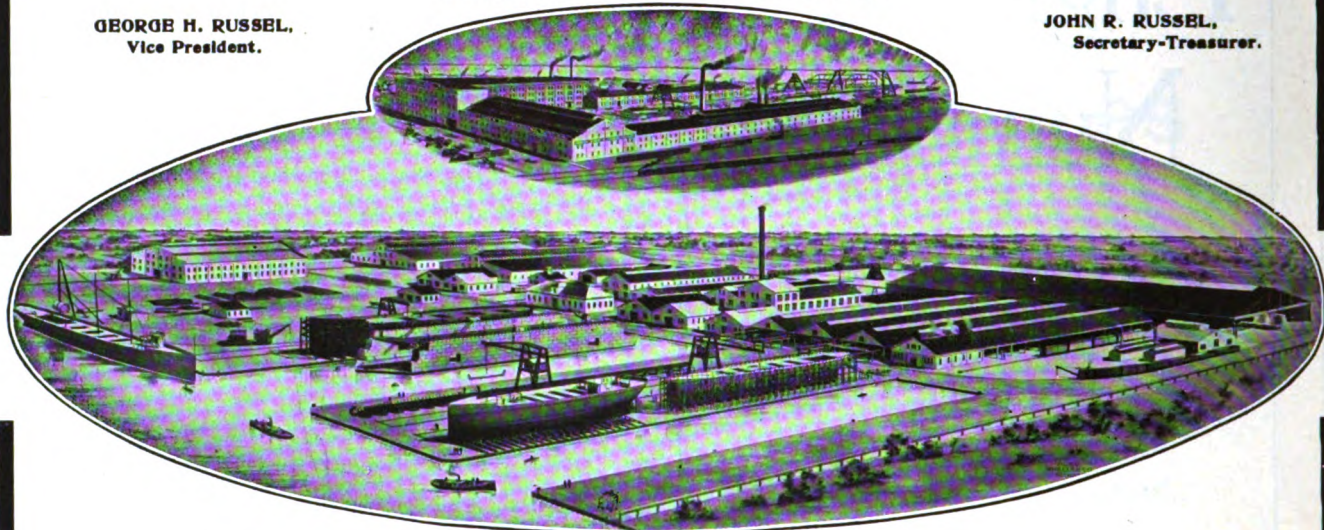
GREAT LAKES ENGINEERING WORKS

DETROIT, MICH.

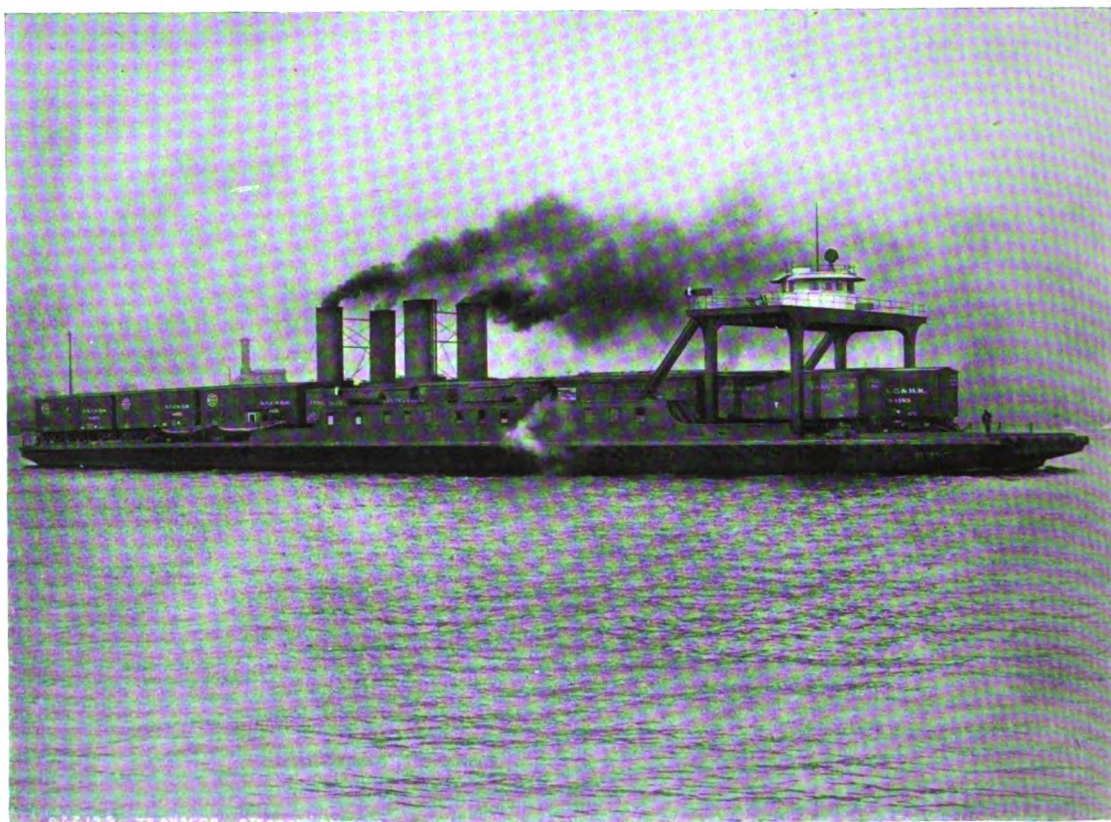
ANTONIO C. PESSANO, President and Gen. Mgr.

GEORGE H. RUSSEL,
Vice President.

JOHN R. RUSSEL,
Secretary-Treasurer.



**Designers and Builders of
Steel Freight and Passenger Ships.
Marine Engines. = Hydraulic Dredges.**



Ice Crushing Car Ferry "Detroit."

Marine Repairs a Specialty

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (MARCH, 1905)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	-	-	-	-	-	-	-	360,560 H. P.
English Royal Navy	-	-	-	-	-	-	-	966,300 "
Russian Imperial Navy	-	-	-	-	-	-	-	253,800 "
Japanese Imperial Navy	-	-	-	-	-	-	-	122,700 "
Austrian Imperial Navy	-	-	-	-	-	-	-	56,700 "
Italian Royal Navy	-	-	-	-	-	-	-	32,500 "
Chilian Navy	-	-	-	-	-	-	-	26,500 "
Argentine Navy	-	-	-	-	-	-	-	13,000 "
The "Messageries Maritimes" Company	-	-	-	-	-	-	-	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.)	-	-	-	-	-	-	-	Steamships
plying between Dieppe and Newhaven	-	-	-	-	-	-	-	18,500 "
Compagnie Generale Transatlantique	-	-	-	-	-	-	-	1,500 "
Total Horse Power of Boilers in Use								1,939,660

Société Anonyme des Etablissements Delaunay Belleville

CAPITAL: 6,000,000 FRANCS

Works and Dock Yards of the Ermitage at Saint-Denis (Seine), France.

Telegraphic Address: Belleville, Saint-Denis-Sur-Seine

Geo. L. McCurdy

169 Jackson Boulevard

CHICAGO ILLINOIS

INSURANCE

HULLS and CARGOES

DIRECT REPRESENTATIVE OF LEADING
AMERICAN AND FOREIGN UNDERWRITERS



ASHTON

Cam Lever Pop Safety Valves
and Non-Corrosive
Steam Gauges.

give highest efficiency and durability.
Specify them and get the best.

The Ashton Valve Co.

Boston New York Chicago
U. S. A.

When *your* contract hinges on ability to deliver
the goods promptly—

LOOK IN OUR STOCK LIST.

THE
BOURNE-FULLER CO.
IRON, STEEL
PIG IRON
COKE

Cleveland, Ohio

Buyers' Directory of the Marine Trade

For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by The Marine Review, Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.

Great Lakes Engineering Works.....Detroit.
Mietz, Aug. New York.

AIR PORTS, DEAD LIGHTS, ETC.

Marine Mfg. & Supply Co.....New York.

AIR PUMPS AND APPLIANCES.

Fore River Ship & Engine Co., Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

ANCHORS.

Bowers, L. M. & Co.....Binghamton, N. Y.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FOULING AND ANTI-CORRO-SIVE COMPOSITION FOR STEEL VESSELS.

Holzappel's American Composition Co.....
.....New York.

ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.

ARTIFICIAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F., Co.....Hyde Park, Mass.

ASH EJECTORS.

Great Lakes Engineering Works.....Detroit.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Potter & Potter.....Buffalo.
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon Cleveland

BAROMETERS, MARINE GLASSES, ETC.

Ritchie, E. S. & Sons.....Brookline, Mass.

BELT CONVEYORS.

Link Belt Machinery Co.....Chicago.

BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.

Power Specialty Co.....Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.

BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

BOILER CLEANING DEVICE.

Power Specialty Co.....Detroit.

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works....Chicago.

BOILER MANUFACTURERS.

Almy Water Tube Boiler Co., Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Bertram Engine Works Co., Ltd.....
.....Toronto, Can.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Dearing Water Tube Boiler Co.....Detroit.
DeLauney, Belleville & Co., St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. A. & Co.....Hoboken, N. J.
Fore River Shipbuilding Co., Quincy, Mass.
Georgian Bay Engineering Works.....
.....Midland, Ont.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Works.....
.....Oswego, N. Y.
Marine Iron Works.....Chicago.

BOILER MANUFACTURERS—Continued.

Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Musher Water Tube Boiler Co.....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
New York Shipbuilding Co., Camden, N. J.
Northwestern Steam Boiler & Mfg. Co.,
.....Duluth, Minn.
Roberts Safety Water Tube Boiler Co.,
.....New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co., Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

BOILER RIVETS.

Bourne-Fuller Co.....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co., Cuyahoga Falls, O.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co., Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co.....Cincinnati.
Macbeth Iron Co.....Cleveland.

BRIDGES, BUILDERS OF.

Cowing, John P.....Cleveland.
Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.

Brown Hoisting & Conveying Machine Co.
.....Cleveland.
McMyler Mfg. Co.....Cleveland.
Mayo & Bailey Chicago.

BULKHEAD DOORS, WATERTIGHT.

"Long Arm" System Co.....Cleveland.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

CANVAS SPECIALTIES.

Baker & Co., H. H.....Buffalo.
Bunker, E. A.....New York.
Upson-Walton Co.....Cleveland.

CAPSTANS.

American Ship Windlass Co., Providence, R. I.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CARPETS, RUGS AND FURNITURE.

Williams & Rodgers Co.....Cleveland.

CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co.....Jersey City, N. J.

CHAINS.

Woodhouse Chain Works.....Trenton, N. J.

CHAIN CONVEYORS, HOISTS.

Brown Hoisting Machinery Co. (Inc.).....
.....Cleveland.
General Electric Co.....Schenectady, N. Y.

CHAIN HOISTS.

Boston & Lockport Block Co.....Boston, Mass.

CHARTS.

Penton Publishing Co.....Cleveland.
Potter, J. D.....London.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

COAL AND ORE HANDLING MACHINERY.

Brown Hoisting Machinery Co. (Inc.).....
.....Cleveland.
Link Belt Machinery Co.....Chicago.
McMyler Mfg. Co.....Cleveland.

COMPASSES.

Ritchie, E. S. & Sons.....Brookline, Mass.

CONDENSERS.

Great Lakes Engineering Works.....Detroit.
Thropp & Sons Co., John E.....Trenton, N. J.

CONTRACTORS FOR PUBLIC WORKS.

Breymann & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.
.....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co.,
.....Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.
Sullivan, M.....Detroit.

CORDAGE.

Baker & Co., H. H.....Buffalo.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.

CRANES, TRAVELING.

Brown Hoisting Machinery Co.....Cleveland.
McMyler Mfg. Co.....Cleveland.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DREDGING CONTRACTORS.

Breymann & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.
.....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co.,
.....Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.
Sullivan, M.....Detroit.

DRYING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.

DRY DOCKS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.

ELECTRIC HOISTS AND CRANES.

General Electric Co.....Schenectady, N. Y.

ELECTRIC LIGHT AND POWER PLANTS.

General Electric Co.....Schenectady, N. Y.
Mietz, Aug. New York.
Sturtevant, B. F. & Co.....Hyde Park, Mass.
Thropp & Sons, John E.....Trenton, N. J.

WANTED and FOR SALE Department.**PROPOSALS.**

Treasury Department, Office of General Superintendent U. S. Life-Saving Service, Washington, D. C. April 4, 1905. Sealed proposals will be received at this office until 2 o'clock p.m. of Friday the 25th day of April, 1905, and then publicly opened, for furnishing supplies required for use of the Life-Saving Service for the fiscal year ending June 30, 1906; the supplies to be delivered at such points in New York City, Grand Haven, Mich., and San Francisco, Cal., as may be required, and in the quantities named in the specifications. The supplies needed consist of Beds and Bedding; Blocks and Sheaves; Cordage; Crockery; Furniture; Hardware; Lamps; Lanterns, etc.; Medicines, etc.; Paints, Oils, etc.; Ship Chandlery; Stoves, etc.; Tools, and Miscellaneous Articles; all of which are enumerated in the specifications attached to the form of bid, etc., which may be obtained upon application to this office, or to the Inspector of Life-Saving Stations, 17 State Street, New York City; Superintendent Twelfth Life-Saving District, Grand Haven, Mich., and Superintendent Thirteenth Life-Saving District, New Appraisers' Stores, San Francisco, Cal. Envelopes containing proposals should be addressed to the "General Superintendent U. S. Life-Saving Service, Washington, D. C.," and marked on the outside "Proposals for Annual Supplies." The right is reserved to reject any or all bids, and to waive defects if deemed for the interests of the Government. S. I. Kimball, General Superintendent. April 20

SEALED PROPOSALS will be received at the office of the Light-House Board, Washington, D. C., until 2 o'clock p.m., May 18, 1905, and then opened, for furnishing the materials and labor of all kinds necessary for the construction and delivery of the single-screw steel steam light-vessel, No. 82, in accordance with specifications, copies of which, with blank proposals and other information, may be had upon application to Rear Admiral B. P. Lambertson, U. S. N., Chairman. April 20

PROPOSALS FOR REPAIRING BREAK-WATER.—U. S. Engineer Office, 262 Huron Street, Cleveland, O., April 3, 1905. Sealed proposals for repairing the shore end of the West Breakwater at Cleveland Harbor, Ohio, will be received at this office until 2 P. M., May 6, 1905, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. DAN C. KINGMAN, Lieut. Col. Corps of Engineers, U. S. A. April 27

PROPOSALS FOR SHEATHING BREAK-WATER.—U. S. Engineer Office, 262 Huron Street, Cleveland, O., April 3, 1905. Sealed proposals for sheathing the harbor face of the West Breakwater at Cleveland Harbor, Ohio, will be received at this office until 2 P. M., May 6, 1905, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. DAN C. KINGMAN, Lieut. Col. Corps of Engineers, U. S. A. April 27

PROPOSALS FOR RIPRAPSTONE FILLING.—U. S. Engineer Office, 262 Huron Street, Cleveland, O., April 3, 1905. Sealed proposals for filling with large riprap along the lake face of the West Breakwater at Cleveland Harbor, Ohio, will be received at this office until 2 P. M., May 6, 1905, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. DAN C. KINGMAN, Lieut. Col. Corps of Engineers, U. S. A. April 27

PROPOSALS FOR CONSTRUCTION OF BREAKWATER.—U. S. Engineer Office, 262 Huron Street, Cleveland, O., April 4, 1905. Sealed proposals for constructing the shore end of the West Breakwater at Fairport Harbor, Ohio, will be received at this office until 2 P. M., May 6, 1905, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. DAN C. KINGMAN, Lieut. Col. Corps of Engineers, U. S. A. Apr. 27.

U. S. Engineer Office, Milwaukee, Wis., April 15, 1905.—Sealed proposals for dredging Gladstone Harbor, Mich., concrete superstructure on Breakwater and on North Harbor Pier, Milwaukee, Wis., and removing old piers and building pile piers and timber superstructure, Waukegan Harbor, Ill., will be received here until 3 P. M., standard time, May 16, 1905, and then publicly opened. Information furnished on application. J. G. Warren, Major Engrs. may 11

PROPOSALS.

PROPOSALS FOR RECONSTRUCTING PIER.—U. S. Engineer Office, 262 Huron Street, Cleveland, O., April 17th, 1905. Sealed proposals for reconstructing and repairing parts of the West Pier at Lorain Harbor, Ohio, will be received at this office until 2 P. M., May 19th, 1905, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. DAN C. KINGMAN, Lieut. Col. Corps of Engineers, U. S. A. may 11

U. S. Engineer Office, Buffalo, N. Y., April 15, 1905.—Sealed proposals for changed and basin excavation at Erie Harbor, Pa., will be received here until 11 A. M. May 15, 1905, and then opened. Information furnished on application. H. M. Adams, Lieut. Col. Engr's. may 11

U. S. Engineer Office, Duluth, Minn., April 13, 1905.—Sealed proposals for furnishing and placing about 53,000 tons of riprap at Ashland, Wis., will be received here until noon, May 13, 1905, and then publicly opened. Information on application. Chas. L. Potter, Major Engrs. may 11

U. S. Engineer Office, Room 508 Federal Bldg., Chicago, Ill., April 15, 1905.—Sealed proposals for rock excavation in Calumet River, Ill., will be received here until noon May 15, 1905, and then publicly opened. Information on application. Wm. H. Bisby, Lieut. Col. Engrs. may 11

U. S. Engineer Office, Buffalo, N. Y., April 13, 1905.—Sealed proposals for concrete superstructure on south pier, Buffalo, N. Y., will be received here until 11 A. M. May 13, 1905, and then opened. Information furnished on application. H. M. Adams, Lieut. Col. Engr's. may 11

U. S. ENGINEER OFFICE, Buffalo, N. Y., April 20, 1905.—Sealed proposals for breakwater extension at Cape Vincent, N. Y., will be received here until 11 A. M. May 20, 1905 and then opened. Information furnished on application. H. M. Adams, Lieut. Col. Engr's. may 18

FOR SALE.**Launches for Sale.**

Gasoline shallow draft launches, 18 and 20 ft.; 3 h. p. sure spark motors, speed up, slow down, our lever control; the same as have been used on Susquehanna river and Danville and Bervick as ferries for the last year through flood and ice. Write for catalogue. E. B. Brower Co., Bloomsburg, Pa. Apr. 13

Tug Wm. Engel.

A first class fishing rig for sale. Tug suitable for fishing or towing. For further information write to Thomas Mader, 81 Middle St., Kenosha, Wis. t.f

Gasoline Tug for Sale.

For Sale—First class gasoline tug 43 ft. long, 9½ ft. beam, 16 h. p. Sintz gasoline engine and equipment in perfect working order. Address, Morton Ryan, 31 River St., Buffalo, N. Y. Apr. 13

Launch For Sale.

42-foot full cabin, mahogany finished cruising launch. Handsomely upholstered; full inventory; first class condition. Address W. E. Mallory, Danbury, Conn. Apr. 13

Marine Engine For Sale.

For sale fore-and-aft compound marine engine, 5 in. by 10 in. by 7 in. upright submerged tube boiler, 44 in. by 72 in., pumps, etc. F. Gibson, 224 Church St., New York City. April 20

FOR SALE.**Lake Tug for Sale.**

Tug Kate Williams—rebuilt 1901, rates 1½. Moored Manitowoc, Wis., where she may be inspected. For prices and terms address Lake Shore Stone Co., Milwaukee, Wis. Apr. 20

Dredging Outfits for Sale.

Two dipper dredges one partly burned; two combination dipper and clam shell dredges; four tugs; dump scows; flat scows; dredging appliances. Complete business to be closed out. For particulars address Carlin, Stickney & Cram, Detroit. Apr. 20

Motor Boat For Sale.

On the St. Lawrence river: A specially built motor boat, 32x6, fitted with a double cylinder, 14 horse motor. A remarkably beautiful and excellent boat, but as the owner thinks it too small for his use, will sacrifice so as to build a larger one. Big bargain for some one. It is almost finished. Do not overlook this. I have dozens of other hulls in stock, all sizes, all prices, or will build to order anything you want. Henry E. Francis, Jr., Alexandria Bay, N. Y. t.f

For Sale.

Marine boiler and engine complete. Boiler 4 x 8, allowed 120 lbs. steam. Engine 12 square, high pressure. All in good condition. Address Box 48, Sandusky, O. April 20

Steam Yacht for Sale.

A 71 foot steam yacht, thoroughly up to date, of handsome lines; a splendid sea boat; perfectly equipped and in order, and well adapted for Southern or South American waters; an excellent boat for cruising; now getting ready to go into commission; photographs and particulars submitted. A Mugford, 136 Liberty St., New York. April 27

Lighter for Sale.

Lighter Annie Walker for sale. Hull 93x20x9½. House 70x18x8. Address, Mutual Transit Co., Buffalo, N. Y. Apr. 20

FOR SALE.**Steam Yacht Cygnet**

35 ft. over all; 7 ft. beam. Has electric light and keel condenser. Burns oil for fuel. In fine order.

J. L. ALBERGER,

Ellicott Square, - BUFFALO, N. Y. Apr. 13

Tug Jim Pullar and Scow.

Tug—built in 1894; 61 ft. long; 15 ft. beam. Water tube boiler. Compound condensing engine. Strong and seaworthy.

Scow—five years old. Excellent construction; 132 ft. long; 29½ ft. wide at center, 26 ft. wide at ends. Platform style, with stake pockets.

Tug and Scow recently overhauled and are in good condition. May be seen at Washburn, Wis., dock.

Address, Fowler-Jacobs Co., Fisher Building, Chicago. t.f.

Buyers' Directory of the Marine Trade.—Continued.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
 Atlantic Works.....East Boston, Mass.
 Bertram Engine Works Co., Ltd.....
Toronto, Can.
 Chicago Ship Building Co.....Chicago.
 Chase Machine Co.....Cleveland.
 Cramp, Wm. & Sons.....Philadelphia.
 Craig Ship Building Co.....Toledo, O.
 Dake Engine Co.....Grand Haven, Mich.
 Detroit Ship Building Co.....Detroit.
 Fletcher, W. & A. Co.....Hoboken, N. J.
 Fore River Shipbuilding Co.....Quincy, Mass.
 Great Lakes Engineering Works.....Detroit, Mich.
 Hall Bros.....Philadelphia.
 Lockwood Mfg. Co.....East Boston, Mass.
 Marine Iron Works.....Chicago.
 Maryland Steel Co.....Sparrows Point, Md.
 Mietz, Aug.....New York.
 Milwaukee Dry Dock Co.....Milwaukee.
 Mosher, Chas. D.....New York.
 Moulton Steering Engine Co.....New York.
 Newport News Ship Building Co.....Newport News, Va.
 New York Shipbuilding Co.....Camden, N. J.
 Northwestern Steam Boiler & Mfg. Co.....
Duluth, Mich.
 Roach's Ship Yard.....Chester, Pa.
 Sheriffs Mfg. Co.....Milwaukee.
 Superior Ship Building Co.....Superior, Wis.
 Thropp, J. E. & Sons Co.....Trenton, N. J.
 Trout, H. G.....Buffalo.
 Willard, Chas. P. & Co.....Winthrop Harbor, Ill.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
 Marine Mfg. Supply Co.....New York.

ENGINE TESTING.

Kreer & Parsons.....Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co.....Chicago.
 Kieley & Mueller.....New York.
 Lunkenheimer Co.....Cincinnati.
 New York Belting & Packing Co.....New York.
 Northwestern Steam Boiler & Mfg. Co.....
Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander.....Cleveland.
 Hunt, Robt. W. & Co.....Chicago.
 Kidd, Joseph.....Duluth, Minn.
 Kreer & Parsons.....Chicago.
 Lovejoy, H. O.....Buffalo.
 Mosher, Chas. D.....New York.
 Nacey, James.....Cleveland.
 Rice, Henry.....Buffalo.
 Roelker, H. B.....New York.
 Wood, W. J.....Chicago.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Hyde Park, Mass.

FEED WATER PURIFIERS AND HEATERS.

Greacen-Derby Engineering Co.....
Perth Amboy, N. J.
 Reilly Repair and Supply Co., Jas.....New York.
 Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.
 Fore River Shipbuilding Co.....Quincy, Mass.
 Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons.....Cleveland.

FUEL ECONOMIZERS.

Sturtevant Co., B. F.....Hyde Park, Mass.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
 Ironville Dock & Coal Co.....Toledo, O.
 Parker Bros. Co., Ltd.....Detroit.
 Pickands, Mather & Co.....Cleveland.
 Pittsburg Coal Co.....Cleveland.
 Smith, Stanley B. & Co.....Detroit.
 Smith Coal & Dock Co., Stanley B. Toledo, O.

FUELING PLANTS, BUILDERS OF

Link Belt Machinery Co.....Chicago.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.
 Georgian Bay Engineering Works.....
Midland, Ont.

GAUGES, STEAM AND VACUUM.

American Steam Gauge & Valve Mfg. Co.....
Boston.
 Ashton Valve Co.....Boston.
 Lunkenheimer Co.....Cincinnati.

GAUGES, WATER.

Bonner & Co., Wm. T.....Boston.
 Lunkenheimer Co.....Cincinnati, O.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

GREASE EXTRACTORS.

Greacen-Derby Engineering Co.....
Perth Amboy, N. J.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
 Brown Hoisting Machinery Co. (Inc.).....
Cleveland.
 Chase Machine Co.....Cleveland.
 General Electric Co.....New York.
 Georgian Bay Engineering Works.....
Midland, Ont.
 Hyde Windlass Co.....Bath, Me.
 McMyler Mfg. Co.....Cleveland.
 Marine Iron Co.....Bay City.
 Mietz, Aug.....New York.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Great Lakes Engineering Works.....Detroit.
 Roelker, H. B.....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
 Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
 Crane Co.....Chicago.
 Jenkins Bros.....New York.
 Lunkenheimer Co.....Cincinnati.
 Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.

Elphicke, C. W. & Co.....Chicago.
 Fleming & Co., E. J.....Chicago.
 Gilchrist & Co., C. P.....Cleveland.
 Hawgood & Co., W. A.....Cleveland.
 Helm & Co., D. T.....Duluth.
 Hutchinson & Co.....Cleveland.
 McCarthy, T. R.....Montreal.
 McCurdy, Geo. I.....Chicago.
 Mitchell & Co.....Cleveland.
 Parker Bros. Co., Ltd.....Detroit.
 Peck, Chas. E. & W. F.....New York & Chicago.
 Prindiville & Co.....Chicago.
 Richardson, W. C.....Cleveland.
 Sullivan, D. & Co.....Chicago.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland, O.
 Hanna, M. A. & Co.....Cleveland.
 Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Georgian Bay Engineering Works.....
Midland, Ont.
 Marine Iron Works.....Chicago.
 Truscott Boat Mfg. Co.....St. Joseph, Mich.
 Willard, Chas. P.....Winthrop Harbor, Ill.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co.....Pittsburg.
 Drein, Thos. & Son.....Wilmington, Del.
 Kahnweiler's Sons, D.....New York.

LIGHTS, SIDE AND SIGNAL.

Russell & Watson.....Buffalo.

LOGS.

Nicholson Ship Log Co.....Cleveland.
 Walker & Sons, Thomas.....Birmingham, Eng.
 Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.

Crane Co.....Chicago.
 Lunkenheimer Co.....Cincinnati.

LUMBER.

Martin-Barriss Co.....Cleveland.

MACHINISTS.

Chase Machine Co.....Cleveland.
 Hickler Bros.....Sault Ste. Marie, Mich.
 Lockwood Mfg. Co.....East Boston, Mass.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.

Hickler Bros.....Sault Ste. Marie, Mich.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
 Detroit Ship Building Co.....Detroit.
 Great Lakes Engineering Works.....Detroit.
 Sturtevant, B. F. Co.....Hyde Park, Mass.

METALLIC PACKING.

Katzenstein, L. & Co.....New York.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

Fisher Electrical Works.....Detroit.
 General Electric Co.....Schenectady, N. Y.
 Sturtevant, B. F. Co.....Hyde Park, Mass.

NAUTICAL INSTRUMENTS.

Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.

Hynd, Alexander.....Cleveland.
 Kidd, Joseph.....Duluth, Minn.
 Kreer & Parsons.....Chicago.
 Lovejoy, H. O.....Buffalo.
 Matteson & Drake.....Philadelphia.
 Mosher, Chas. D.....New York.
 Nacey, James.....Cleveland.
 Rice, Henry.....Buffalo.
 Wood, W. J.....Chicago.

OAKUM.

Stratford, Oakum Co.....Jersey City, N. J.

OIL ENGINES.

Mietz, Aug.....New York.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
 Standard Oil Co.....Cleveland.

PACKING.

Crane Co.....Chicago.
 Jenkins Bros.....New York.
 Katzenstein, L. & Co.....New York.
 New York Belting & Packing Co.....New York.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
 Carbolineum Wood Preserving Co.....Milwaukee.
 New Jersey Zinc Co.....New York.
 Upson-Walton Co.....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WANTED and FOR SALE Department Continued.

**Steam Yacht Catherine.**

FOR SALE—Length 78 ft., beam 18 ft., triple expansion engines, water-tube boiler, allowed 200 lbs.; electric light, search light, mahogany deck-house 9 x 16, power launch, complete outfit, all in first-class condition. One of the best family cruising yachts on the Lakes. Inquire Wickes Bros., Saginaw, Mich. tf

**For Sale.**

This up-to-date Gasoline Yacht 65x9½, mahogany finished throughout; large cabin, plate glass windows, mahogany blinds; fine carpets and upholstery; excellent electric light plant—dynamo, storage batteries and search light. Entire boat can be easily converted into cabin if desired.

Rapid fire yacht cannon; anchor, life preservers, flags, etc., complete. Very fast 4 cylinder, 4 cycle King engine of 50 h. p. Cost nearly \$8,000, will sell at great bargain.

O. J. MULFORD, Stevens Bldg., Detroit.

Marine Boiler.

For Sale.—One 50 H. P. Scotch Marine Boiler, 10 ft. long, 78 in. diameter, 160 lbs. steam pressure. Manufactured by Ritter & Co., Buffalo, N. Y. In first-class shape. For particulars, write The Detroit Stove Works, Detroit, Mich. t. f.

The Williams & Rodgers Co.,

SUPERIOR AND SENECA STREETS,
Cleveland, O.

CARPETS, RUGS, FURNITURE, CURTAINS, BEDDING
AND ALL OTHER FURNISHINGS USED IN CABINS.

**WE MAKE A
SPECIALTY OF FITTING
OUT BOATS.**

SPECIAL RATES TO THE MARINE TRADE.

Bring your Boat Wants and your Family Wants to this store and we will take the very best care of you. Dry Goods, Housefurnishings, Carpets, Furniture and all other articles found in a first-class Dry Goods House.

The Williams & Rodgers Co.,
Cleveland, Ohio.

ROACH'S SHIP YARD.

Ship
Building
in all its
Branches

Builders of

STEAMSHIP AND MARINE MACHINERY.

Delaware River Iron Ship Building & Engine Works,
Chester, Pa.

FORE RIVER SHIPBUILDING CO.

Steel Ship and Marine Engine Builders.

CONTRACTORS FOR

U. S. Torpedo Boat Destroyers Lawrence and Macdonough.
U. S. Protected Cruiser Des Moines.
U. S. Battleships New Jersey and Rhode Island.
U. S. Steam Light-Vessel No. 72.

Office and Works, - - QUINCY, MASS., U. S. A.

The Lockwood Manufacturing Co.

EAST BOSTON, MASS.

ENGINEERS AND MACHINISTS.

Builders of Steamships, Tow Boats and Marine Engines.

Repairing of Hulls and Machinery.

W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS.

MARINE ENGINES, BOILERS, Etc.

Hudson, 12th and 14th Sts., HOBOKEN, N. J.

Take Ferry from foot of West 22nd St., New York.

The Atlantic Works, EAST BOSTON, Massachusetts.

BUILDERS OF

Steamships, Steam Yachts, Tow Boats, Etc.

Marine Engines, Boilers and Tanks.

Heavy Machinery and Plate Iron Work.

THREE MARINE RAILWAYS.

THE SHIPOWNERS DRY DOCK CO.

CHICAGO, ILL.

Building and Repairing of Steel and Wooden Ships with economy and dispatch.

Yard and Dry Docks: Halstead St. and North Branch.
Largest Dry Dock: 480 ft. on keel blocks.

Office, 381 No. Halstead St. Phone, North 1658.

Fogg's Resilient
Felt
Mattresses and
Cushions
Manufactured by
M. W. FOGG
202 Front St., N. Y.



Send for Illustrated Catalogue.

THE ALLEN DENSE-AIR ICE MACHINE

Contains no chemicals, only air. Proven by many years' service in the tropics on United States men-of-war, steam yachts and passenger steamers. A hundred are in daily service on steamers.

H. B. ROELKER, 41 Maiden Lane, NEW YORK.

Consulting and Con-
structing Engineer.

Designer and Manufacturer
of Screw Propellers.



Established 1844

A. SCHRADER'S SON
32 Rose Street, NEW YORK

Manufacturer of

Submarine Armor and Diving Apparatus

We carry a complete stock of Dresses, Hose and
Repair Sundries.

Improved Bolt Helmet

All orders filled day received

Write for our prices

Buyers' Directory of the Marine Trade.—Continued.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co.....Duluth, Minn.
Parker Bros. Co., Ltd.....Detroit.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.
Sullivan, M.....Detroit

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland, O.
Crane Co.....Chicago.
Macbeth Iron Co.....Cleveland.
Reading Iron Co.....Reading, Pa.

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.
Reading Iron Co.....Reading, Pa.

PRESSURE REGULATORS.

Kieley & Mueller.....New York.
Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co.....Bath, Me.
Lockwood Mfg. Co.....East Boston, Mass.
Marine Iron Works.....Chicago.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....Newport News, Va.
Roelker, H. B.....New York.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp & Sons Co., J. E.....Trenton, N. J.
Trout, H. G.....Buffalo.

PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works.....Detroit.
Marine Iron Works.....Chicago.
Kingsford Foundry & Machine Works.....Oswego, N. Y.

RANGES.

Stamford Foundry Co.....Stamford, Conn.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register.....Cleveland.

REPAIRS—ENGINE AND BOILER.

(See also Boiler Manufacturers and Engine Builders.)
Georgian Bay Engineering Works.....Midland, Ont.

RIVETS, STEEL FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland, O.

SAFETY VALVES.

American Steam Gauge & Valve Mfg. Co.....Boston.
Ashton Valve Co.....Boston.
Crane Co.....Chicago.
Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.....Schenectady, N. Y.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bertram Engine Works Co., Ltd.....Toronto, Can.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....Newport News, Va.
New York Shipbuilding Co.....Camden, N. J.
Roach's Ship Yard.....Chestertown, Pa.
Shipowner's Dry Dock Co.....Chicago.
Smith & Son, Abram.....Algonac, Mich.
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
Marine Mfg. & Supply Co.....New York.
Upson-Walton Co.....Cleveland.

SHIP DESIGNERS.

Kidd, Joseph.....Duluth.
Kreer & Parsons.....Chicago.
Matteson & Drake.....Buffalo.
Rice & Lovejoy.....Buffalo.
Steel, Nacey & Hynd.....Cleveland.
Wood, W. J.....Chicago.

SHIP LANTERNS AND LAMPS.

Russell & Watson.....Buffalo.

SHIPMATE RANGES.

Stamford Foundry Co.....Stamford, Conn.

SHIP TIMBER.

Martin-Barriss Co.....Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Fall's Hollow Staybolt Co., Cuyahoga Falls, O.
Reading Iron Co.....Reading, Pa.

STEAM VESSELS FOR SALE.

Gilchrist & Co., C. P.....Cleveland.
Holmes, Samuel.....New York.
Lester, S. S.....Quebec, Can.
McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line.....New York.
Anchor Line.....Buffalo.
Boston Steamship Co.....Boston.
International Mercantile Marine Co.....Philadelphia.
New York & Cuba Mail S. S. Co.....New York.
Red Star Line.....New York.
United Fruit Co.....Boston.

STEEL CASTINGS.

Otis Steel Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.
Moulton Steering Engine Co.....New York.
Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Gaskin, Edward.....Buffalo.
Hynd, Alexander.....Cleveland.
Lovejoy, H. O.....Buffalo.
Matteson & Drake.....Philadelphia.
Parker Bros. Co., Ltd.....Detroit.
Nacey, James.....Cleveland.
Rice, Henry.....Buffalo.
Steel, Adam.....Cleveland.
Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
Lunkenheimer Co.....Cincinnati, O.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co., Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co.....Kingston, Ont.

TRAPS, STEAM.

Kieley & Mueller.....New York.
Sturtevant Co., B. F.....Hyde Park, Mass.

TRUCKS.

Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge & Valve Mfg. Co.....Boston.
Ashton Valve Co.....Boston.
Crane Co.....Chicago.
Jenkins Bros.....New York.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
Ross Valve Co.....Troy, N. Y.

VALVES FOR WATER AND GAS.

Lunkenheimer Co.....Cincinnati.
Ross Valve Co.....Troy, N. Y.

VARNISHES.

Detroit Varnish Co.....Detroit.
Detroit White Lead Works.....Detroit.
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co.....Hyde Park, Mass.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., F. J.....Chicago.
Gilchrist & Co., C. P.....Cleveland.
Hall, John B.....Buffalo.
Helm & Co., D. T.....Duluth.
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel.....New York.
Hutchinson & Co.....Cleveland.
Lester, S. S.....Quebec, Can.
McCarthy, T. R.....Montreal.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

VESSEL FURNISHINGS.

Williams & Rodgers Co.....Cleveland.

WATER GAUGES.

Bonner & Co., Wm. T.....Boston.
Lunkenheimer Co.....Cincinnati, O.

WATERTIGHT BULKHEAD DOORS.

"Long Arm" System Co.....Cleveland.

WHISTLES, STEAM.

American Steam Gauge & Valve Mfg. Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co.....Cincinnati.

WILFORD'S WATERPROOF CLOTH.

Bunker, E. A.....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

WINDLASSES.

American Ship Windlass Co., Providence, R. I.
American Ship Building Co.....Cleveland.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

WINCHES.

American Ship Windlass Co., Providence, R. I.
Georgian Bay Engineering Works.....Midland, Ont.
Hyde Windlass Co.....Bath, Me.

WOOD PRESERVING PAINT.

Carbolincum Wood Preserving Co., Milwaukee.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co.....Kingston, Ont.
Parker Bros. Co., Ltd.....Detroit.

YACHT AND BOAT BUILDERS.

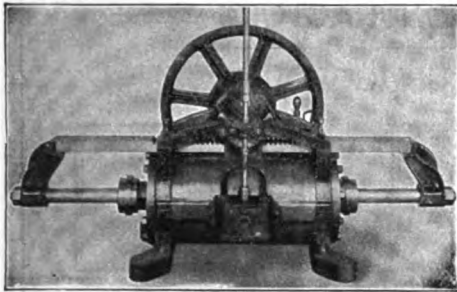
Bertram Engine Works Co., Ltd.....Toronto, Can.
Drein, Thos. & Son.....Wilmington, Del.
Georgian Bay Engineering Works.....Midland, Ont.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P. & Co.....Winthrop Harbor, Ill.

YACHT BROKERS.

Clapham & Clapham.....New York.

YAWLS.

Drein, Thos. & Son.....Wilmington, Del.

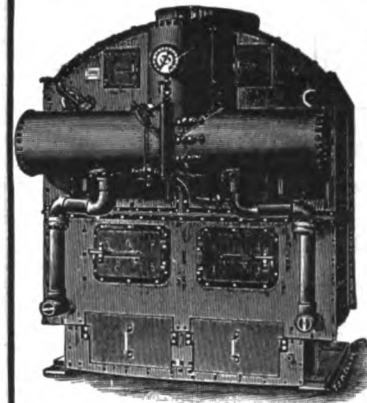
A STEAM STEERER

**DIRECT
—and—
POSITIVE**
QUICK ACTING.

Especially adapted for
Steam Yachts,
Ferryboats,
Lake, Ocean
and Harbor
Tug Boats.

Send for Cata-
logue and
Particulars.

MOULTON STEERING ENGINE CO., 1691 BROADWAY,
NEW YORK CITY.



**250 STEAM
VESSELS**

Now Equipped With

ALMY'S PATENT

SECTIONAL

Water Tube Boilers

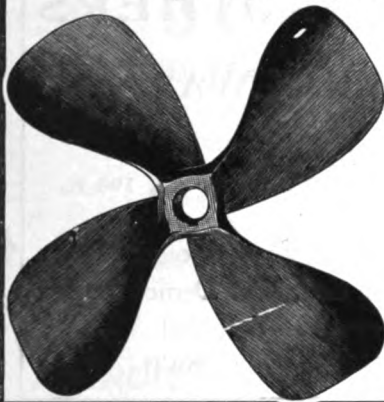
Bear Evidence of Their

Excellent Qualities

**Almy Water-Tube
Boiler Co.**

PROVIDENCE, R. I.

Thirty Years' Experience building



**Engines
and
Propeller
Wheels.**

H. G. TROUT,
King Iron Works,
226 Ohio St.,
BUFFALO, N. Y.

Northwestern Steam Boiler & Mfg. Co.

DULUTH, MINN.

Manufacturers of

**BOILERS, ENGINES
AND MACHINERY**

Special facilities for Marine
Work. Repairs promptly
attended to Night or Day.

We carry a complete
line of Marine and
Engineers' Supplies.

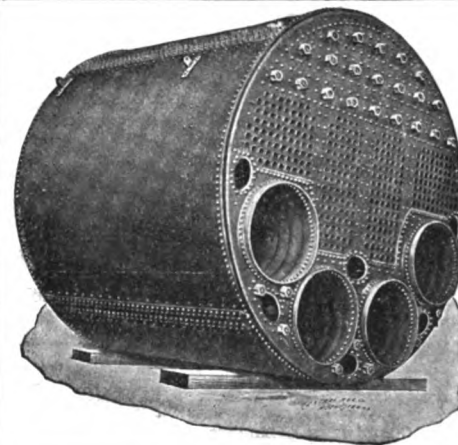
TELEPHONES: OFFICE AND WORKS, 615.
RESIDENCE CALLS: M. A. P. VAN, Pres. and Gen'l Mgr., 776-R;
J. H. OPPERMAN, Secretary, 579-R; E. KRIZ, Superintendent, 557-M.

FALLS HOLLOW STAYBOLT Co.
ANY SIZE, OUTSIDE OR INSIDE DIAMETER.
AVERAGE LENGTH OF HOLLOW BARS
EIGHT TO TEN FEET.
STAYBOLT BARS
BOTH HOLLOW AND SOLID,
MADE OF BEST QUALITY DOUBLE REFINED CHARCOAL
IRON OR STEEL. CUYAHOGA FALLS, O. U.S.A.

Makers of only the Highest Quality of Staybolt Material, in Hollow and Solid Bars, from the Best Double-Refined Charcoal Iron or Steel. **FALLS HOLLOW STAYBOLT IRON** Is the only Reliable Flexible Staybolt in the World.

The Only Staybolt Iron which responds in service to the expansion and contraction of fire box; which relieves the material in molecular strains; which is self protective from burning; which does not make the side sheets crack; which earns its own cost in oxygen through it to the fire; always sure in giving warning of breakage.

The Staybolt which lasts longest, requires least repairs, gives longest life to the fire box, and the longest service in the engine on the rails. In use by Leading Railways of the United States, Canada, Mexico, Japan and Norway. Also by Marine Engineers and the United States Government. And by the Manufacturers of Mining Drills and by others requiring absolutely reliable material.



**MARINE
BOILERS**

OF ALL TYPES

**KINGSFORD
FOUNDRY &
MACHINE
WORKS,**

Oswego, N. Y.

Latest Patent Anchors

THE
National and International.

APPROVED BY LLOYDS.

Manufactured by
L. M. BOWERS & CO.,
Binghamton, N. Y.

Furnished to
Lake Trade by

The Upson-Walton Co.
CLEVELAND



CATALOGUE ON APPLICATION.

*Every engineer should have the illus-
trated book showing how to make
repairs with Smooth-On. Sent free by
writing to the Smooth-On Mfg. Co.,
Jersey City, N. J., U. S. A.*

G. H. Breymann & Bro's

CONTRACTORS FOR PUBLIC WORKS

Dredging, Dock Building, Etc.

5, 6 AND 7 MARINE BUILDING
TOLEDO, OHIO.

The Fitz-Simons & Connell Co.

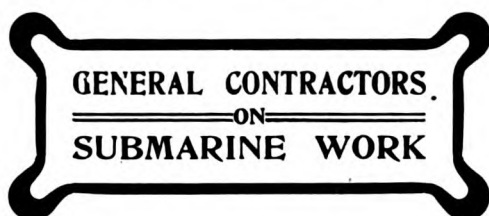
CONTRACTORS FOR PUBLIC WORKS

DREDGING
DOCKS
PILE DRIVING
BREAKWATERS

TUNNELS
CANALS
BRIDGES
FOUNDATIONS

Offices: 1010-1014 Tacoma Building, Chicago.

BUFFALO DREDGING CO.



Office D. S. MORGAN BLDG.
BUFFALO, N. Y.

HICKLER BROTHERS

MARINE RAILWAY

Capacity, 1,000 tons.

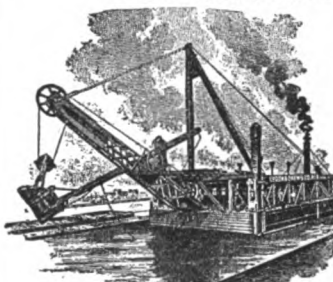
Draft, 7½ ft. forward, 13½ ft. aft.

Length on keel blocks, 180 ft.; over all, 190 ft.

Machine Shop, Foundry and Steam Forge.
Dredges, Drill Boats and Derrick Scows.

SAULT STE. MARIE, - MICH.

CHICAGO & GREAT LAKES DREDGE AND DOCK CO.



OWNS AND OPERATES THE PLANTS
OF THE FORMER COMPANIES:

Lydon & Drews Co.,
Hausler & Lutz Co.,
Green's Dredging Co.,
Chicago Star Con. & D.
Co.,
McMahon & Montgomery
Co.,
Chicago Dredging & Dock
Co.,
Griffith, McDermott &
Watt Dredging Co.

Contractors for
RIVER AND HARBOR IMPROVEMENTS.

Main Office:—1319-1322 Chamber of Commerce - CHICAGO.

Lake Superior Contracting & Dredging Co.

GENERAL CONTRACTORS FOR PUBLIC AND
PRIVATE WORK.
RIVER AND HARBOR IMPROVEMENTS.

Two 20-inch Hydraulic Dredges specially equipped
for handling Clay, Gravel and all kinds of dredgeable
material. Filling and reclaiming lands a specialty.

General Office, Wolvin Building, Duluth, Minn.
OPERATING OFFICE, SUPERIOR, WIS.

Dunbar & Sullivan Dredging Co., of Buffalo, N. Y.

Will contract to remove ROCK or EARTH on the Great Lakes to 40 ft. depth.
To remove ROCK on Atlantic Coast to 40 ft. depth.

THAT'S ALL.

We SOMETIMES rent plant to responsible parties at OUR terms.

Dredges.

Brian Boru, Steel.
Tipperary Boy, Steel.
Erin Go Braugh.

Drill Boats.

Geo. A. Howells and
another, both Steel.

Tugs.

Shaughraun, Steel.
Phil Sheridan, Steel.
Spalpeen, Steel.
Paddy Miles, Steel.
Shaun Rhue, Steel.

Derrick.

Faugh a Ballaugh.

Scows.

Monroe Doctrine, 600 yds., Steel.
Protective Policy, 500 yds., Steel.
Reciprocity, 600 yds., Steel.
Cuba Libre, 250 yds., Steel.
Gold Standard, 250 yds., Steel.
No. 5, 600
No. 6, 600
No. 7, 600
No. 8, 600

McMyler derrick handling 10
tons at 75 ft. radius.

Small Scows.

THE L. P. & J. A. SMITH COMPANY.

CONTRACTORS FOR PUBLIC WORKS

Dredging,	Dry Docks and	Bridges,
Harbor Work,	Pier Building,	Submarine
Pile Driving,	Railroads,	Foundations,
Breakwaters,	Canals,	Etc., Etc.

Offices: Williamson Bldg., Cleveland, O.

C. H. STARKE DREDGE & DOCK CO.,**Contractors for Public Works.**

**DREDGING, PILE DRIVING,
— AND —
SUBMARINE PIPE LAYING.**

Canal Street, West of First Avenue,
Milwaukee, - - Wisconsin.

N. SULLIVAN,
DREDGING OF ALL KINDS.

**THE REMOVING OF DEEP
WATER EARTH AND ROCK
A SPECIALTY. - - -**

53 Woodward Ave. Terrace,
DETROIT, - - - MICH.

Steamboat Fuel at Ashtabula.**Large Supplies of Best Quality.**

**Lighter Carrying Different
Grades at all Times.**

Fuel Scow with elevators and discharging spouts. Storage of 800 tons.
Discharges 250 tons an hour into steamers while unloading cargo.

M. A. Hanna & Co., Miners and Shippers,
Main Office, Perry-Payne Bldg., Cleveland.

Toledo Office, 429 Spitzer Bldg.
 Cleveland Office, 610 Perry-Payne Bldg.

Fuelings Ironville Dock (Toledo Harbor)
 Plants Huron Dock (Huron Harbor)

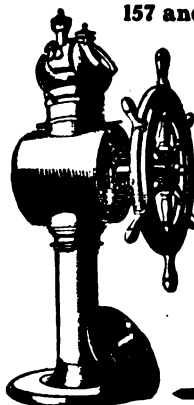
**THE IRONVILLE DOCK & COAL
COMPANY**

BITUMINOUS COAL
For Steamboat Fuel and Cargo Shipment

CLEVELAND, OHIO.

610 Perry-Payne Building

Bell Phone Main 572

MARINE MFG. & SUPPLY CO.**157 and 158 South St., NEW YORK.****SHIP FITTINGS AND SUPPLIES**

**CAPSTANS, WINDLASSES,
STEERING APPARATUS, ENGINE
ROOM TELEGRAPHS, BRASS
AIR PORTS, DEAD LIGHTS,
PUMPS, ETC.**

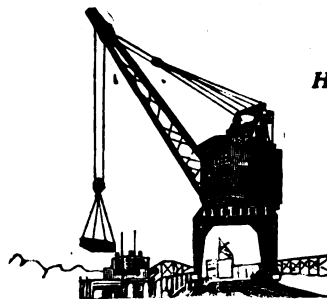
Catalogue A—Air Ports, Ventilators, etc.
 Catalogue B—Windlasses, Pumps, etc.
 Catalogue C—Steering Apparatus.

Others in course of preparation.

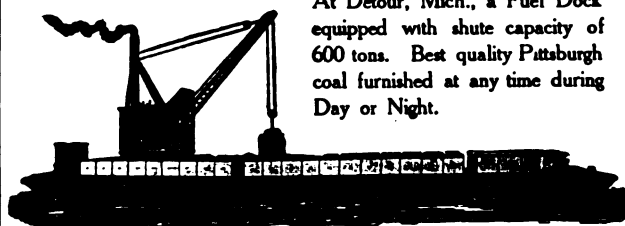
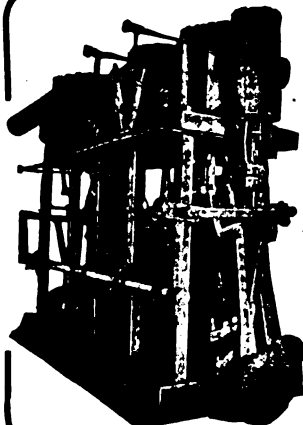
McMYLER MFG. CO.,
Cleveland, O., U.S.A.

Designers and Builders
of

*Hoisting and Conveying
Machinery,
Vessel Unloading
Machinery,
Revolving Cranes,
Car Dumpers,
Clam Shell Buckets,
Etc.*

**PICKANDS, MATHER & CO.****FUEL LIGHTERS at Buffalo, Erie, Ashtabula and Cleveland.**

At Detour, Mich., a Fuel Dock
equipped with chute capacity of
600 tons. Best quality Pittsburgh
coal furnished at any time during
Day or Night.

**Western Reserve Building,****CLEVELAND, O.**
**Chas. P. Willard
& Co.**

**F. C. WALTER, MANAGER
WINTHROP HARBOR
ILLINOIS**

Builders of

**Marine Engines and Boilers,
Paddle Wheel Engines,
Boat Machinery,
High Pressure, Compound
and Triple
Expansion Engines,
Yachts and Launches.**

Write for Catalogue.



For your own protection

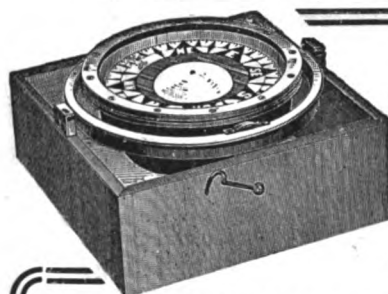
When purchasing a boiler, specify the American Marine Board of Trade Pop Safety Valve. You then have the best; your equipment will cost you no more and your safety is assured.

Can we send you our Catalogue No. 9-H telling why?

American Steam Gauge & Valve Manufacturing Co.

208-220 CAMDEN STREET, BOSTON

NEW YORK SAN FRANCISCO ATLANTA CHICAGO



Ritchie Liquid Compass

The Standard Liquid Compass used exclusively by the U. S. Navy for over 35 years. Over 25,000 used in Merchant Service.

Made in all sizes and styles, from 2 to 12 inches diameter of card. All compasses made by us have our name printed below the North point or prominently upon the card. **None other are genuine.** Latest form with four or six needles, the best instrument for iron ships. For sale by ship chandlers and nautical instrument dealers. Catalogue free.

E. S. RITCHIE & SONS, Brookline, Mass., U. S. A.
MANUFACTURERS OF NAUTICAL AND PHYSICAL APPARATUS.



**LIGHT
STRONG
DURABLE**

**CLOTH
THAT'S IN
DEMAND**

Wilford's Waterproof Cloth is made of twisted pure flax thread. It is pliable—will not crack, and much stronger than cotton. Impenetrable by salt or fresh water. Suitable for Tarpaulins, sail, hatch or boat covers, etc. A superior waterproof cloth. Test its merits.

EDWARD A. BUNKER

Sole Agent for the United States and Canada

P. O. BOX 1579, NEW YORK

ESTABLISHED, 1854.



SHERIFFS
MANUFACTURING CO.

Manufacturers of
**PROPELLER
WHEELS**

Marine Engines
and Repairs.

Milwaukee, Wis.

Phone S. 163

GEO. STRATFORD OAKUM CO.

JERSEY CITY, NEW JERSEY.

Established
1860



Manufacturers
of all grades of

Oakum

**Spun
Cotton**

FOR SALE AT SHIP CHANDLERS EVERYWHERE.

The Martin-Barriss Co.

654 Seneca Street CLEVELAND, OHIO

IMPORTERS AND MANUFACTURERS OF

**MAHOGANY
WHITE MAHOGANY**

and all Native Cabinet Woods

High Grades of Kiln Dried Woods for Cabin Work and Inside Trim

WHITE OAK TIMBERS AND PLANK

Constantly on Hand and Sawed to Order on Short Notice

CRANE FITTINGS

PRESERVES WOODWORK AGAINST ROT PREVENTS DECAY OF CANVAS AND ROPES

The most practical
and economical
paint in its line.

**AVENARIUS
CARBOLINEUM**
Registered

Results based on
30 years use. For
particulars address

CARBOLINEUM WOOD PRESERVING CO.,
MILWAUKEE, WIS.

Aids to Navigation

are of vital importance to vessel interests.

SCHERZER ROLLING LIFT BRIDGES

aid navigation and meet with the approval of all vessel interests, because of the wide and unobstructed channel provided for navigation, enabling vessels to pass easily and rapidly through the draw.

The Scherzer Rolling Lift Bridge Co.

Main Offices: 1616 Monadnock Block,
CHICAGO, U. S. A.

WARD LINE

THE NEW YORK & CUBA MAIL
STEAMSHIP CO.

POPULAR ROUTE TO

CUBA, NASSAU, MEXICO

FINEST AND LARGEST STEAMSHIPS SAILING
FROM NEW YORK TO OTHER THAN EUROPEAN
PORTS. HOLDERS OF THE RECORD BETWEEN
HAVANA AND NEW YORK — 1,240 MILES IN 61
HOURS.

FOUR SAILINGS EACH WEEK BETWEEN
NEW YORK and HAVANA.

WEEKLY SERVICE TO GUANTANAMO, SANTIAGO, MANZANILLO
AND CIENFUEGOS, CUBA, PROGRESO, VERA CRUZ
AND TAMPICO, MEXICO.

SEMI-MONTHLY SAILINGS TO
Nassau, N. P. Bahamas.

LOW RATES OF FREIGHT AND PASSAGE.

SEND FOR OUR SCHEDULES, RATES AND DESCRIPTIVE MATTER.

James E. Ward & Co.

GENERAL AGENTS

90 Wall Street, NEW YORK.

AMERICAN LINE

PLYMOUTH
CHERBOURG
SOUTHAMPTON

Sailing From New York Every Saturday at 9:30 a. m.

St. Louis
(11,629 tons)
New York
(10,798 tons)

St. Paul
(11,629 tons)
Philadelphia
(10,786 tons)

Special Express Train from Plymouth and Southampton
to London and between Cherbourg and Paris.

RED STAR LINE

NEW YORK
ANTWERP
LONDON
PARIS

CALLING AT DOVER FOR LONDON AND PARIS.
Sailing Every Saturday at 10:30 a. m.

Finland
(12,780 tons)

Kroonland
(12,780 tons)

Vaderland
(12,017 tons)

Zeeland
(11,905 tons)

One of the Shortest Routes to LONDON, PARIS, BELGIUM, HOL-
LAND, GERMANY, THE RHINE, SWITZERLAND and ITALY.

9 Broadway, New York.

Broad and Sansom Sts., Philadelphia.
India Building, 84 State Street, Boston.
1906 F St., N. W., Washington, D. C.
219 St. Charles St., New Orleans
90-96 Dearborn St., Chicago.
Century Building St. Louis.
Guaranty Building, S. Minneapolis.
21 Post St., San Francisco.
375 Robert St., St. Paul.
41 King St., East Toronto.
17 St. Sacramento St., Montreal.

PIERS: 14 & 15 NORTH

RIVER, FOOT OF FUL-

TON ST., NEW YORK.

United Fruit Co's Steamship Lines

CARRYING FAST UNITED STATES AND FOREIGN MAILS.

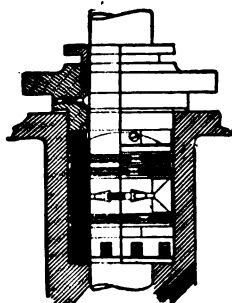
First-Class Passenger Service to Jamaica

Weekly Sailings from

BOSTON, PHILADELPHIA and BALTIMORE

Fare One Way, \$40.00 — Round Trip, \$75.00

For full information apply to
DIVISION PASSENGER AGENT
At either port.



Katzenstein's Self- Acting Metal Packing

For PISTON RODS, VALVE STEMS,
etc. of every description for Steam Engines,
Pumps, etc., etc. Adopted and in use by
the principal Iron Works and Steamship
Companies in this and foreign countries.

FLEXIBLE TUBULAR METALLIC
PACKING, for slip-joints on Steam Pipes,
and for Hydraulic Pressure; also METAL
GASKETS for all kinds of flanges and
joints.

For full particulars and reference, address

L. KATZENSTEIN & CO.

GENERAL MACHINISTS, BRASS FINISHERS, ENGINEERS' SUPPLIES.
358 West street, New York.

BOSTON STEAMSHIP CO.

S. S. "SHAWMUT" S. S. "TREMONT" S. S. "LYRA"

Japan, South China and Manila Steamship Line

Operated in connection with the

**Northern Pacific and Great Northern
Railway Companies.**

Monthly Passenger and Freight Service from
Tacoma and Seattle, Washington.

New Twin-screw American Steamships of
10,000 tons register. Exceptionally large
staterooms, all outside.

OWING TO THE GREAT SIZE OF THE SHIPS,
AND THE IMMENSE CARGOES CARRIED IT HAS
NEVER BEEN NECESSARY TO USE RACKS ON
THE DINING TABLES.

Rates at any office of

NORTHERN PACIFIC RAILWAY,
GREAT NORTHERN RAILWAY,
CHICAGO, BURLINGTON & QUINCY RAILWAY,
THOMAS COOK & SONS, Tourists Agents.

A. WINSOR, PRES.
Boston, Mass.

F. WATERHOUSE, AGENT,
Seattle, Wash.

VESSEL AND INSURANCE AGENTS.

JOHN J. BOLAND & CO.,
Vessel and Insurance Agents.

800-804 Prudential Bldg.,
Both Phones. BUFFALO, N. Y.

C. W. Elphicke. J. J. Rardon. M. C. Reuter.

C. W. ELPHICKE & CO.
Vessel and Insurance Agents.

No. 6 Sherman St., CHICAGO, ILL.
Telephone, Harrison 1194.

E. J. FLEMING & CO.
Vessel and Insurance Agents.

2-4 Sherman St., CHICAGO, ILL.

Office: Tel., Harrison 4975. Residence: Tel. Wentworth 5004.

C. P. GILCHRIST & CO.
Vessel and Insurance Agents.

Sale and Exchange of Vessels a Specialty.
Lumber and Coal Chartering.
Full Telephone Service, Office and Residence.
(Local and Long Distance.)

411 Perry-Payne Bldg., Cleveland, O.

JOHN B. HALL,
Vessel Agent.

17 Exchange Bldg., 202 Main St.,
Telephone, Seneca 892. BUFFALO, N. Y.

W. A. Hawgood. Arthur H. Hawgood.

W. A. HAWGOOD & CO.
Vessel and Insurance Agents.

220-21 Perry-Payne Bldg., Cleveland, O.
Telephones: { Office, Main 2395.
Res. W. A. Hawgood, Doan 84-J.
Res. A. H. Hawgood, Doan 841-J.

D. T. HELM & CO.
Vessel and Insurance Agents.

Telephones—Office 233.
Res. 331-3.

DULUTH, - - - MINN.

SAMUEL HOLMES,

Steamship Offices,
For Selling, Chartering and Building all
Classes Steam Vessels
Steam Vessel Circulars
Weekly Freight Circulars
Morris Bldg, 66-8 Broad St., New York.

C. L. Hutchinson. W. H. McGean.

HUTCHINSON & CO.
Vessel and Insurance Agents.

Phones: { Office, Main 2453.
Res. C. L. Hutchinson, Ridge 845 L.
Res. W. H. McGean, East 1421-J.
313-15 Perry-Payne Bldg., Cleveland, O.

S. S. LESTER,

Steamship Agent and Freight Broker.

Manager Steamer
ST. LAWRENCE,
83 Dalhousie St. QUEBEC, QUE.

VESSEL AND INSURANCE AGENTS.

T. R. MCCARTHY,

Steamship and Freight Broker,
Chartering, Forwarding and General Com-
mission Agent; and Broker for the Sale,
Purchase and Construction of Steam-
ers and Sailing Vessels.

Marine and Fire Insurance Effected.

Cable Address, "Macarthy, Montreal."

(Watkins', Scott's Liebers and A. B. C.
Codes Used.)

Shipping Agent to The Asbestos & Asbestic
Co., Ltd., of Danville, Que., and The Belgo
Pulp & Paper Co., Shawinigan Falls, Que.

404 Board of Trade Bldg., MONTREAL, CAN.
Correspondence Invited and Agencies Solicited.

J. Mitchell. J. F. Wedow. A. Mitchell.

MITCHELL & CO.

Vessel and Insurance Agents.

508-10 Perry-Payne Bldg., Cleveland, O.

Office Tel. M. 767. Res. John Mitchell, Doan 841.
John F. Wedow, Doan 141-J.
Alfred Mitchell, Doan 218.

PARKER BROS. CO., LTD.,

Vessel, Marine Insurance and Wreck-
ing Agents. Marine Surveyors.

Office Tel. Main 5314. Night: Main 290.
Night: Grand 1723 J.

15 Atwater St. West, DETROIT, MICH.

Insurance.

PRINDIVILLE & COMPANY,

Average Adjusters.

Insurance Brokers.

12 Sherman Street, CHICAGO.

Representing: Johnson & Higgins, New York.

W. C. RICHARDSON,

Vessel Owner and Broker and
Marine Insurance Agent.

420-421 Perry Payne Building,
CLEVELAND, O.

Office Tel., 338. Residence Tel., 2938.

D. Sullivan. F. J. Sullivan.

D. SULLIVAN & CO.

Vessel Agents.

Marine Insurance.

2-4 Sherman St., CHICAGO, ILL.
Office Tel., Harrison 2847. Res. Ashland 2483.

MARINE INSURANCE,

by

WILLIAM GOW.

Price, \$1.50

THE PENTON PUB. CO.,
Cleveland, O.

NAVAL ARCHITECTURE,

by

THOS. H. WATSON.

A manual on laying off iron and steel ves-
sels. Valuable for naval architects as well as
beginners in ship yards.

Price, \$5.00

Order from

THE PENTON PUB. CO.,
Cleveland, O.

PROCTORS IN ADMIRALTY.

ALBERT J. GILCHRIST,

Proctor in Admiralty.

604 Perry Payne Building,
CLEVELAND, O.

**GOULDER, HOLDING &
MASTEN,**
Law Offices.

H. D. Goulder. S. H. Holding. F. S. Masten.
Perry Payne Building,
CLEVELAND, O.

HOYT, DUSTIN & KELLEY,
Lawyers and Proctors in Admiralty.

Offices, 702 Western Reserve Building,
CLEVELAND, O.

C. E. KREMER,

Counselor at Law and
Proctor in Admiralty.

Suite 821-822 New York Life Bldg.,
CHICAGO, ILL.

RAY G. MacDONALD,

Attorney-at-Law and
Proctor in Admiralty.

630 First National Bank Building,
Telephone, Central 3507
Automatic 8085 CHICAGO, ILL.

Geo. S. Potter. Meredith Potter.

POTTER & POTTER,
Lawyers and Proctors in Admiralty.

35-36 Dun Building, 110 Pearl Street,
BUFFALO, N. Y.

**SHAW, WARREN, CADY &
OAKES,**

Attorneys-at-Law.
and Proctors in Admiralty.

Union Trust Bldg, DETROIT, MICH.

**WHITE, JOHNSON,
McCASLIN & CANNON,**
Attorneys-at-Law and
Proctors in Admiralty.

Williamson Bldg, CLEVELAND, O.

HAND BOOK

OF

ADMIRALTY LAW,

by

ROBT. M. HUGHES,

Price, \$3.75

THE PENTON PUB. CO.,
Cleveland, O.

PROFESSIONAL.

ROBERT W. HUNT & CO.,

*Bureau of Inspection.
Tests and Consultation.*

1121 The Rookery, CHICAGO.
Monong. Bank Bldg., PITTSBURG.
66 Broadway, NEW YORK.

Inspectors of shipbuilding material and machinery. Inspectors of all materials. Duty tests of engines and boilers. Physical and chemical laboratories.

PROFESSIONAL.

John G. Kreer.

Ralph M. Parsons.

KREER & PARSONS,
*Naval Architects,
Ship Engineers and Builders.*

Steel Tugs, Lighters, Barges, Shallow-draft Steamboats for river service. Designers for all classes of Boats and Marine Machinery.

ENGINE TESTS.

Works and Office,
2 to 24, Lawrence St., CHICAGO.
Telephone North 1688.

PROFESSIONAL.

HENRY RICE and
H. O. LOVEJOY,

*Naval Architects.
Consulting Engineers.*

Surveyors of Wood and Steel Ships, Engines and Boilers. Estimates of cost given. Superintendence of building and repairing. Plans and specifications furnished for all classes of ships.

Lines and models furnished.

Room 18,
202 Main Street., BUFFALO, N. Y.

JOSEPH KIDD,

*Marine Architect and Surveyor.
Consulting Ship Builder and Engineer*

Over thirty years' experience. Specifications, designs and estimates. Superintendence of construction and repairs. Damage and other surveys carefully attended to. Negotiations for the building, charter or sale of all kinds of vessels and machinery.

610 Board of Trade,
DULUTH, MINN.

James Nacey.

Alexander Hynd.

NACEY & HYND,
*Marine Architects.
Mechanical Draughtsmen.
Consulting Engineers.*

Specifications and designs for all descriptions of marine vessels, engines and boilers. Supervision of construction and repairs. Damage and other surveys carefully attended to.

Agents for Marine Specialties.

208-9 Western Reserve Building,
CLEVELAND, O.
Phone, Main 3390 J.

W. J. WOOD,

Naval Architect, Consulting Engineer.

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs. Arbitrator and court expert.

FIRE BOATS A SPECIALTY.

Complete Plans furnished for Steel, Composite or Wooden Vessels.

709 Rialto Building, CHICAGO.
Tel. Harrison 1020.

NAVAL ARCHITECTS' AND
ENGINEERS' DATA BOOK,

By T. H. WATSON.

Price, \$1.50

THE PENTON PUB. CO.,
Cleveland, O.

AMBROSE V. POWELL,

Member American Society Civil Engineers

Civil Engineer.

Designs and Constructs Dry Docks, Harbor Works, Docks, and Plant for Handling Coal and Ore, Foundations
Office, 1008 Chamber of Commerce,
CHICAGO, ILL.

JUST PUBLISHED

CLASS BOOK OF
NAVAL ARCHITECTURE
BY W. J. LOVEIT

Illustrated Price \$2.50
Order from Marine Review, Cleveland

BRITISH ADMIRALTY CHARTS

The latest Editions of Charts, Plans and Sailing Directions published by the British Admiralty. Can be obtained from Admiralty Agent by Appointment.

J. D. POTTER,

148 MINORIES
LONDON, ENGLAND

OFFICIAL CATALOGUE
OF CHARTS (880 pages) 1s.

An abridged Catalogue of Charts of
Nautical Books (free on application.)

ABRAM SMITH & SON,
ALGONAC, MICH.

Wooden Ship Building and Redbuilding.

Before placing your work we will be pleased with an opportunity to quote YOU our prices.



METALLIC LIFE BOATS AND
RAFTS, YACHTS AND
PLEASURE BOATS
LIFE PRESERVERS

Outfit for Lake Steamers a specialty.

THOMAS DREIN & SON, Builders, Tatnell St. below Railroad
WILMINGTON, DEL.

WANTED
A
YACHT

OUR SEARCH-LIGHT

YACHT BROKERS
150
NASSAU
ST.
NEW YORK
ROOM 637.

WORKS BOTH WAYS

YACHT
FOR
SALE

CLAPHAM AND CLAPHAM

THOMAS CLAPHAM.

IF YOU WANT TO BUY OR SELL A YACHT OF
ANY DESCRIPTION IT WILL PAY YOU TO WRITE
FOR PARTICULARS AND GET ON OUR LIST.

G. GRIFFITH CLAPHAM.

John Donnelly, Sr., Pres.
H. B. Folger, Treas.

John Donnelly, Jr., Vice-Pres.
Thos. Donnelly, Secy.

**THE
DONNELLY SALVAGE & WRECKING CO., LTD.
KINGSTON, ONT.**

DIVERS, STEAM PUMPS, TUGS, ETC.
SUPPLIED ON SHORTEST NOTICE.

THE "GAYNOR"

Improved Cork Block Life Preservers.

Wired and unwired. The new standard preservers. Best on the market. Unrivalled in reliability, construction, strength, quality and durability of materials. Approved by the board of supervising inspectors of the steamboat inspection service, at its meeting in Washington, D. C., December, 1904.

Manufactured by **THE NATIONAL CORK CO.**
261 Lorimer St., Brooklyn, N. Y.
Who will send circulars and prices. Or write to
T. F. GAYNOR, 18 Broadway, N. Y., for particulars.

**THE BERTRAM ENGINE WORKS CO.,
TORONTO, CANADA.**

Ship Builders and Marine Engineers.

All Kinds of Repair Work Executed on Short Notice.

GREAT LAKES REGISTER

FOR THE
CLASSIFICATION OF STEEL AND WOODEN VESSELS.



COMBINED AND ISSUED IN CONNECTION WITH
BUREAU VERITAS
INTERNATIONAL REGISTER OF SHIPPING.

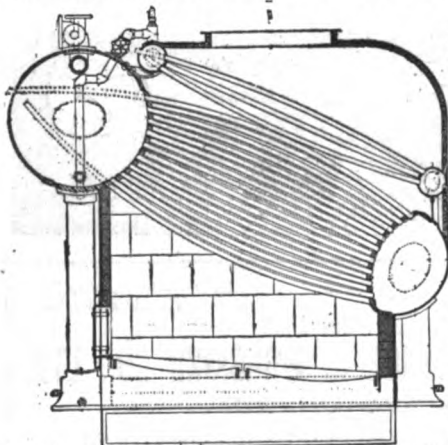
THE RATINGS OF GREAT LAKES REGISTER GO BEFORE AND ARE ACCEPTED BY THE LEADING UNDERWRITERS OF AMERICA AND EUROPE. VESSELS BUILT UNDER THE SUPERVISION OF ITS SURVEYORS WILL RECEIVE SPECIAL RATING, AND WILL ALSO BE PUBLISHED IN BUREAU VERITAS INTERNATIONAL REGISTER OF SHIPPING.

PLANS AND SPECIFICATIONS FURNISHED.

GREAT LAKES REGISTER SURVEYORS ARE ESTABLISHED AT ALL THE PRINCIPAL PORTS ON THE GREAT LAKES.

F. D. HERRIMAN, SURVEYOR GENERAL,
320-322 Perry-Payne Building, CLEVELAND, O.

THE MOSHER PATENT WATERTUBE BOILER.



Simplest, lightest and most compact boiler made. Most accessible for cleaning and repair. Five vertical rows or as many as 45 tubes may be cleaned or withdrawn by removing the cover from a single hand hole. Largest grate surface on a given floor space. No joints in the fire. All joints expanded. Greater steam room and water capacity than any other boiler. Built in sizes up to 2000 H. P. Moshier Boilers have been supplied for eleven torpedo boats and the monitor Florida of the U.S. Navy, amounting to over 28,000 H. P.; six torpedo boats for the Russian Navy, two gunboats for the Mexican government, one cruiser and one torpedo

boat for the Brazilian government; the steam yachts Arrow, Ellide, Feiseen, Wauneta, Presto, and numerous other yachts and vessels.

SEND FOR DESCRIPTIVE CATALOGUE.

MOSHER WATERTUBE BOILER CO., No. 1 BROADWAY, N. Y.

NEW HARBOR CHARTS OF THE LAKES.

Following is a list of harbor charts recently issued from the United States Lake Survey Office, all in colors: Duluth and Superior Harbors, Two Harbors, Ashland, Marquette, Milwaukee, Chicago, Muskegon, Charlevoix, Michigan City, Toledo, Sandusky, Cleveland, Lorain, Fairport, Ashtabula, Conneaut, Erie, Dunkirk, Buffalo and Oswego.

For sale by

THE MARINE REVIEW, - Cleveland, Ohio.

CHARLES E. PECK.

WILLIAM A. PRIME.

CHAS. E. & W. F. PECK,

Insurance Brokers. Average Adjusters.

ESTABLISHED 1870.

NEW YORK, 58 William Street.

BOSTON, 153 Milk St.

BUFFALO, 906 The Fidelity Bldg.

CLEVELAND, 1107-8 Williamson Bldg.

CHICAGO, 1115-16 Royal Insurance Bldg.

REPRESENTED BY

C. T. BOWRING & CO., (Insurance) LTD.,

5 and 6 Billiter Ave., LONDON,
and at "LLOYD'S" LONDON.

HULLS and CARGOES.

We place insurances in the most advantageous markets, employing, in the interest of our clients and with equal facility, all Foreign and Home companies, at the best procurable rates and terms.

We Represent Only the Assured.

Taylor Water Tube Boiler Co.



322 Franklin St.,
DETROIT, MICH.

Vertical Tubes,
sectional, large
steam space and
liberating area.

Fire box, combustion chamber,
and course for the
furnace gases similar to the Scotch
Marine.

Free circulation
type.

Send for full description.

CRANE VALVES

Patterson's Nautical Encyclopedia.

PRICE, \$3.00

Is in all respects a work up to date, correct as to every term known to the shipping world. Sent upon approval. Carriage prepaid.

THE MARINE REVIEW

CLEVELAND.

All of the latest and largest LAKE STEAMSHIPS are completely equipped with

BLAKE DUPLEX AND SIMPLEX PUMPS

SPECIAL MARINE

New Marine Catalog ready about July 1st.

Geo. F. Blake Mfg. Co.,

114 Liberty Street,

New York City.

Chas. Cory & Son,



Manufacturers of
Mechanical
and
Electrical
Telegraphs
and
Indicators.

Engine Bells
and
Electric
Call Bells.

278-279 Division St.
NEW YORK CITY.

OIL vs. GREASE LUBRICATION.
An Interesting Book on an Inter-
esting and Important Subject.
FREE TO ALL ON REQUEST. MENTION THIS PAPER.
JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

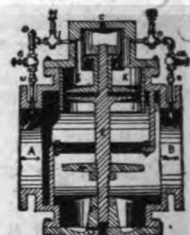
**WATER
FILTERS
REGULATORS
& ENGINES**

We make Pressure Regulating Valves
for all purposes, steam or water.

Our Feed-Water Filter will keep oil
out of your boiler.

We can interest you if you use a condenser.

Water Engines for Pumping Organs



Water Works Regulating Valve
Has no peer
Ask for list of Water Works
using our valves.

THE ROSS VALVE CO. TROY N. Y.

**John E. Thropp
& Sons Co.,**
TRENTON, N. J.



Builders of Single, Compound,
Triple-Expansion and Direct Con-
nected Engines.
Boyer Sectional Water Tube boilers
and machinery complete for
light draft Passenger Boats, Yachts,
Tugs, Etc.

Hand Book of Admiralty Law
By ROBT. M. HUGHES.
\$3.75
Marine Review, - - Cleveland, O.

ORAM FIX. ESTABLISHED 1880. J. W. FIX.
S. FIX'S SONS,
SUCCESSORS TO S. FIX & SON
Steam Flue Welding Works
Our Work Stands Government Test.
Our Welds are Perfectly Smooth.
Write us for Prices.
COR. LEONARD
AND WINTER STS. **Cleveland, O.**

A. J. MORSE & SON.
DIVING APPARATUS
140
CONGRESS ST. BOSTON.

Neversink Cork Jackets and Life Belt.
Warranted 24 pounds. Buoyancy and full weight of Cork, as
required by U. S. Inspectors.

Safest Consolidated Cork Life Preservers. Cheapest
Ring Buoys and Fenders.

Approved and adopted by U. S. Board of Supervising Inspectors. Also
adopted by the principal Ocean, Lake and River Steamer Lines as the
only Reliable Life Preserver. Awarded four Medals by World's Colum-
bian Exposition.



**Metallic and
Wooden
Life Boats.**



Metallic Life Rafts. Marine Drags.

Manufacturers of Woolsey's Patent Life Buoy—the
lightest, cheapest and most compact life raft known.

DAVID KAHNWEILER'S SONS,
Fox Building, Cor. Franklin Sq. and Dover Street,
NEW YORK CITY.

CLEVELAND CITY FORGE & IRON CO.



BEAM STRAP FOR
STEAMER "PURITAN"

RUDDER FRAME FOR UNITED STATES
CRUISER "NEW YORK"

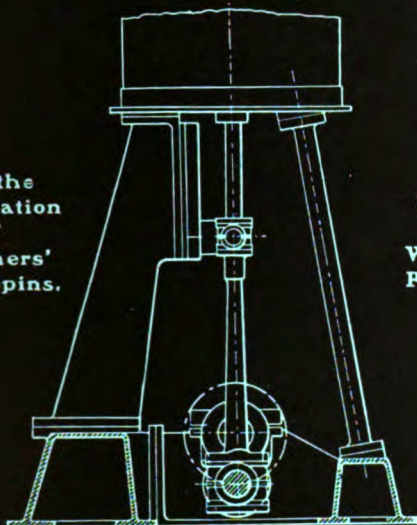
CLEVELAND, O.

IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.

Vacuum

No. 1 MARINE ENGINE OIL

for the
Lubrication
of
Steamers'
Crank-pins.



Holds
the
World's
Record.

STANDARD OIL CO., of New York

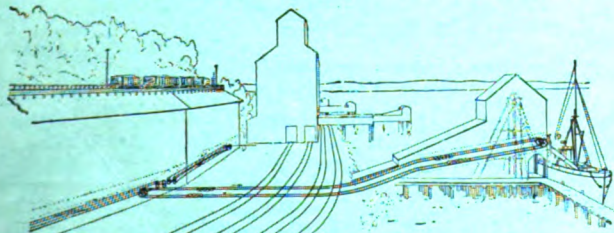
LAKE SHORE AND MICHIGAN SOUTHERN RY.

Eastward	Arrive from West	Depart East
No. 18, Southwestern Limited		*1:50 a.m.
No. 22, Lake Shore Limited	*2:12 a.m.	*2:20 a.m.
No. 20, Chicago and Cleveland Exp. ..	*7:20 a.m.	
No. 28, New York and Boston Exp. ..	*7:40 a.m.	*8:00 a.m.
No. 40, Toledo and Buffalo Accom. ..	†10:00 a.m.	†10:30 a.m.
No. 32, Fast Mail	*11:25 a.m.	*11:30 a.m.
No. 48, Accommodation via Sandusky ..	†1:40 p.m.	
No. 42, Boston-New York Express ..		*11:45 a.m.
No. 44, Cleveland and New York Spl. ..		*3:00 p.m.
No. 46, Southwestern Express		*3:10 p.m.
No. 116, Ashtabula Accommodation.		†4:30 p.m.
No. 6, Limited Fast Mail	*5:40 p.m.	*5:45 p.m.
No. 26, 20th Century Limited	*7:40 p.m.	*7:43 p.m.
No. 10, Chicago, N.Y. & Boston Spl.	*7:30 p.m.	*7:50 p.m.
No. 16, New England Express	*10:30 p.m.	*10:35 p.m.
No. 2, Day Express	†9:10 p.m.	†9:25 p.m.
No. 126, Norwalk Accommodation ..	†7:55 a.m.	
Westward	Arrive from East	Depart West
No. 7, Exposition Limited	*12:50 a.m.	
No. 11, Southwestern Limited	*2:55 a.m.	
No. 9, Day Express		†6:00 a.m.
No. 15, Boston and Chicago Special.	*3:10 a.m.	*3:15 a.m.
No. 19, Lake Shore Limited	*7:15 a.m.	*7:25 a.m.
No. 23, Western Express	*10:30 a.m.	*10:35 a.m.
No. 29, Southwestern Special	†11:10 a.m.	
No. 33, Southwestern Express	*12:25 p.m.	
No. 133, Cleveland and Detroit Exp.		*12:45 p.m.
No. 47, Accommodation	†11:00 a.m.	†3:00 p.m.
No. 141, Sandusky Accommodation.		†3:10 p.m.
No. 43, Fast Mail	*4:35 p.m.	*4:40 p.m.
No. 127, Norwalk Accommodation ..		†5:10 p.m.
No. 37, Pacific Express	*6:50 p.m.	*7:20 p.m.
No. 3, Fast Mail Limited	*10:50 p.m.	*10:55 p.m.
No. 115, Ashtabula Accommodation.	*8:30 a.m.	

*Daily. †Ex. Sunday. ‡Ex. Monday. Nos. 23, 28 and 37 run via Erie Station City Ticket Office, 237 Superior St



Northern Pacific Railway, Tacoma, Wash. Coal is taken from Bunkers shown at left by Link-Belt Carriers, and delivered into Carrier at right angles running out to sea. This latter Conveyor is carried by hinged Truss. Normal capacity 700 tons per hour.



Northern Pacific Railway Co., Tacoma, Wash.
Loading 700 Tons per Hour

Philadelphia

The Link Belt Engineering Co.

Ship Loading Plants

We Design and Build

Complete equipments for transporting material of all kinds from cars to vessels or vessels to cars with or without intermediate storage. We have equipped many of the largest transportation companies in the world with machinery of this character whereby the space occupied and the time and labor otherwise consumed in loading and unloading vessels has been greatly reduced. We will submit plans and estimates on request.

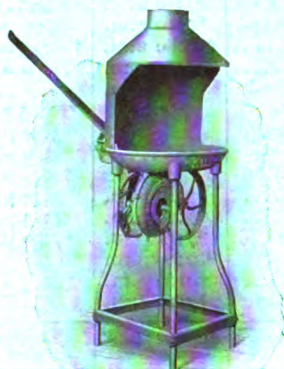
We also Design and Install

Machinery of the highest efficiency for HANDLING MISCELLANEOUS FREIGHT in Steamship Docks and Warehouses.

The Link-Belt Machinery Co.
Engineers, Founders, Machinists. CHICAGO

FORGE FACTS

The Free Area through the tuyere of a Sturtevant Portable Forge is such as to give the full value of the blast from the blower. There is no restriction, and no wasted power.



All parts are constructed to withstand the excessive heat from the fire. The tuyere will not burn out. The firepan is of heavy metal and ribbed to prevent cracking.

Blast is supplied by the well-known Sturtevant blower; the operating device is simple, strong and requires but little power.

Send for more information relating to portable or stationary forges.

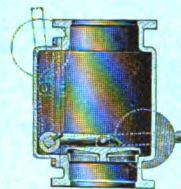
B. F. STURTEVANT CO.

BOSTON, MASS.

General Office and Works, Hyde Park, Mass.
New York Philadelphia Chicago London

Designers and builders of Heating, Ventilating, Drying and Mechanical Draft Apparatus, Fans, Blowers and Exhausters, Steam Engines, Electric Motors and Generating Sets, Fuel Economizers, Forges, Exhaust Heads, Steam Traps, Etc.

EXCELSIOR STRAIGHTWAY BACK PRESSURE VALVE



Thoroughly reliable when used as a back pressure valve, it is equally adapted for use as a relief or free exhaust valve for condensers, and we have supplied many for this purpose. By changing position of outside lever, it will work equally well in a vertical or horizontal position, or at any angle desired.

JENKINS BROS.

New York, Boston, Philadelphia, Chicago, London

GENERAL ELECTRIC COMPANY'S PROJECTORS.



Hand, Pilot House or
Electrical Control

Operated from Direct-Current
Incandescent Lamp
Circuits.

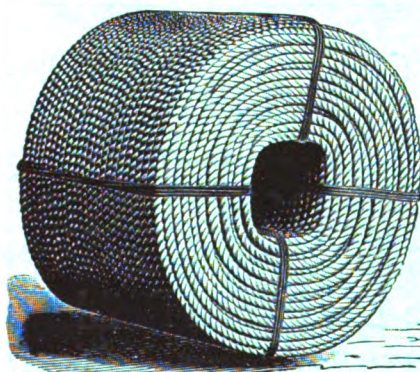
WRITE FOR CATALOGUE.

General Office, Schenectady, N. Y.

Cleveland Office, Citizens Bldg.
Detroit Office, Majestic Bldg.

13-INCH PROJECTOR.
HAND CONTROL.

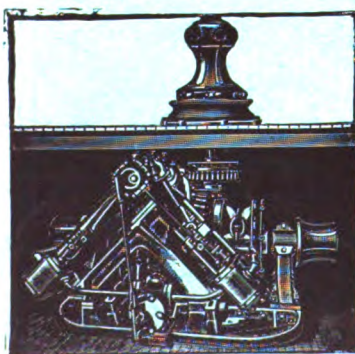
Sales Offices in All Large Cities.



We pride ourselves upon having given the manufacture of rope and cordage more attention than any other house in America. We carry a complete line and can fill all orders quickly.

The UPSON-WALTON Co. - Cleveland, O.

WINDLASSES AND CAPSTANS



HYDE WINDLASS COMPANY,

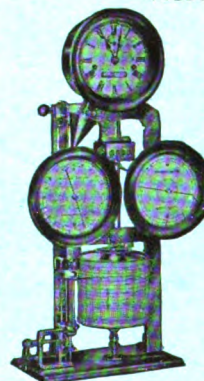
The Hyde Steam and Power Windlasses and Capstans are the best in the market.

They have been selected for most of the vessels now building for the Navy Department, Revenue Marine, Light-house Board and United States Coast Survey

They are being furnished for the majority of the highest class Steam Ships, Merchant Vessels and Yachts now building.

BATH MAINE.

You do not have to guess at the speed of your vessel if equipped with the



NICHOLSON LOG

The exact speed of the moment is constantly before you on a dial, and is recorded on a paper chart. The distance traveled is correctly shown on a counter. Guaranteed to register within 2%. No expense to operate if not abused. Wind the clock once a day and it will do its work automatically.

*Catalogues and Full Information
on request.*

Nicholson Ship Log Co.

204 Superior Street, CLEVELAND, O.

LIFE PRESERVERS—BUOYS

ACME. SOLID CORK. Each Preserver stamped by U. S. Inspector guaranteeing proper buoyancy. Cork Filled Yacht Fenders. Cork Mooring Buoys. Material and Finish Guaranteed.

Orders filled promptly.

ARMSTRONG CORK COMPANY

Boston New York Philadelphia Pittsburg
Chicago St. Louis Baltimore

HOWARD H. BAKER & CO. SHIP CHANDLERS and SAIL MAKERS

18 to 26 Terrace,

BUFFALO, N. Y.